

AD-780 751

REGIONAL LANDFILL AND CONSTRUCTION MATERIAL NEEDS IN
TERMS OF DREDGED MATERIAL CHARACTERISTICS AND
AVAILABILITY

VOLUME II. APPENDIXES A, B, C, AND D

GREEN ASSOCIATES, INCORPORATED

PREPARED FOR
ARMY ENGINEER WATERWAYS EXPERIMENT STATION

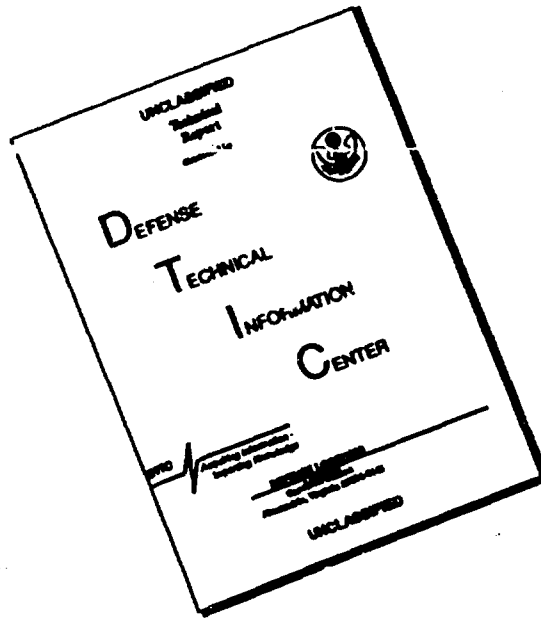
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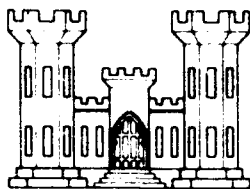
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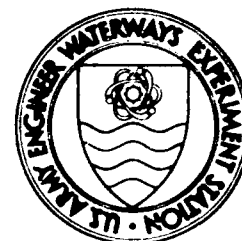
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DREDGED MATERIAL RESEARCH PROGRAM



CONTRACT REPORT D-74-2

REGIONAL LANDFILL AND CONSTRUCTION MATERIAL NEEDS IN TERMS OF DREDGED MATERIAL CHARACTERISTICS AND AVAILABILITY

VOLUME II: APPENDIXES A, B, C, AND D

by

R. Reikenis, V. Elias, E. F. Drabkowski

May 1974

Sponsored by Office of Dredged Material Research

Conducted for U. S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi

Under Contract No. DACW 39-73-C-0141

By Green Associates, Incorporated, Towson, Maryland

ARMY MRC VICKSBURG, MISS

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APPENDIX B - MEMORANDA OF CE DISTRICT VISITS

APPENDIX C - SELECTED MEMORANDA OF TELEPHONE CONTACTS

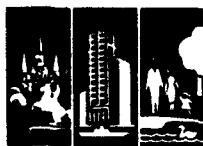
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APPENDIX A

SELECTED LETTERS OF REGIONAL INTEREST

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**PRIDE BUILDS
NEW ORLEANS**

MOON LANDRIEU
MAYOR

CITY OF NEW ORLEANS

October 18, 1973

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Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Ed:

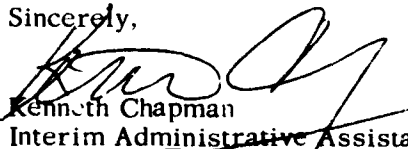
As per our conversations regarding your letter of September 4, 1973 to Mr. J. Renny Schoen re Dredged Spoil Study, you will find attached the following:

1. Generalized land use plan for New Orleans;
2. Airport Site Study;
3. Lakefront Reclamation Project;
4. Pontchartrain New Town Land Use Plan and Engineering Report.

The enclosed items are proposed for development of areas of New Orleans and should answer most of the questions proposed in your letter. I think that after you have reviewed the documents you will have an appreciation of some of the problems of development in New Orleans.

Again, I would like to stress our great interest in the dredge material and will look forward to further correspondence with you in the future.

Sincerely,


Kenneth Chapman
Interim Administrative Assistant

KC:apl
New Community Development Corporation of New Orleans
INTERIM STAFF OFFICE: City Planning Commission / Room 4W04 City Hall
1300 Perdido / New Orleans, La. 70112 / Phone 504 529-4311, ext. 202

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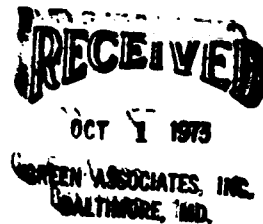


Unit 1 - 10 - 10000

LAFAYETTE
COUNCIL
OF
GOVERNMENTS

P.O. Box 214
Lafayette, La. 70501
Phone: (504) 234-1245 234-4745

COG/309/73
September 26, 1973



Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

First, let me apologize for the delay in responding to your letter in reference to your "Dredge Spoil Study." The correspondence was accidently filed and only recently was the mistake noticed.

In answer to the questions you submitted concerning the use of fill material let me just state that much of the area in and around Lafayette Parish frequently requires fill before development.

1. As a regional planning agency we do have short and long range plans which would require the need for fill.
2. If fill material was readily and economically made available such material could be used in future planning (i.e., industrial parks, sanitary landfills, thoroughfares, and recreation).
3. In the Lafayette area, fill material is used for many purposes including levee construction and whether this can be considered unique is unknown. Along the coastal area, south of Lafayette, cattle mounds (islands) are built in the marshes for high water refuge during hurricanes. Perhaps more information on this could be obtained from the Vermilion Parish Planning Commission in Abbeville, Louisiana, 70510.
4. The amount of fill material which will be needed in future developments is unknown and would be very difficult to determine even if a qualified estimate were prepared.

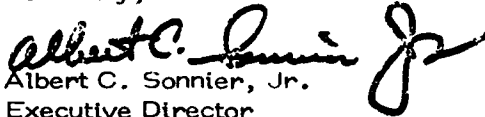
Mr. Edwin F. Drabkowski
Green Associates, Inc.

2

5. A copy of our existing land use inventory is available at a minimum cost of \$5.00 plus postage. A future master land use recommendation is presently being prepared and will be available in December.
6. Lack of fill material poses limitations on many development projects. At the present time, the Lafayette Council of Governments is searching for an adequate Sanitary Landfill site to serve Lafayette Parish. Local soil associations are not conducive to economical landfill operations (no sufficient cover material).

I hope the above information will be of some use in your efforts and if the Lafayette Council of Governments can be of any further assistance please feel free to contact me at any time.

Sincerely,


Albert C. Sonnier, Jr.
Executive Director

ACS/mem

74m

SOUTH CENTRAL PLANNING & DEVELOPMENT COMMISSION

MEMBER PARISHES: ASSUMPTION • LAFOURCHE • ST. CHARLES • ST. JAMES • ST. JOHN THE BAPTIST • TERREBONNE

August 22, 1973

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AUG 27 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green & Associates
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

In response to your letter of August 10, I would like to state that we at the South Central Planning & Development Commission are vitally interested in the economic and environmental aspects of our coastal region. If dredged materials can be used in a beneficial way, then we would most definitely be in favor of such uses. However, we are strongly in support of the policy of developing areas in harmony with the environment, especially in our marshlands. Therefore, we feel that in the area south of the Gulf Intracoastal Waterway, the most beneficial developments would be those associated with our present types of water borne transportation (such as oil related industries). In other words, for a variety of reasons we do not feel that large residential and industrial developments would be either economically or environmentally feasible in that particular area.

Before answering your questions, I would like to point out that we are a relatively new commission - actually less than one year old - and that we have not yet completed our land-use and resource surveys. Therefore, if some of our answers are not as concise as you would prefer, I hope that you will understand our situation.

In answer to your questions, I will follow the outline of your letter.

1. Yes, we have both short and long range plans to develop areas that require fill. Since some seventy-two percent (72%) of the entire region is covered by either water or water-related vegetation (i. e., flooded land, marshland, or swamp), it is obvious that the relative shortage of developable land necessitates the use of land fill. We are in the process of analyzing our resources and developing plans for our future land use, and these projects should be completed shortly.

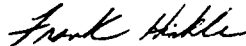
EFD
Ram
ROB
BS

2. It would be essential that fill material be used in almost any new development in this area, especially as a protection against flooding.
3. To expand upon Answer No. 1, the vast amount of water-related land makes our situation rather unique in that virtually every development in this area requires at least some land fill.
4. We are unable to determine at this time the specific needs of future developments, although it would be safe to assume that a substantial amount of fill could be used in various places.
5. We have not yet completed any of the maps referred to in this question. We have however, enclosed a copy of our base map. Upon completion of other projects, pertinent information will be forwarded to you upon request.
6. The primary problem in this area is concerned with flooding and flood insurance protection. The landfill could be used in this respect by raising the elevation of the building area, thus protecting against floods and increasing the possibility of securing flood insurance.

Dredged material is presently being used 1) to fill in swampy areas; 2) as levees; and 3) as foundations in various building sites.

We certainly hope this will help you and the Corps of Engineers in your analysis of the coastal areas, and if you need any further information, feel free to contact us. Also, we are very interested in this project and would appreciate a copy of your Dredged Spoil Study upon completion.

Sincerely,



Frank Hinkle
Environmental Planner

FH/ps

CR CAPITAL REGION PLANNING COMMISSION
PC 333 1/2 19th St. P. O. Box 3355 Baton Rouge, La. 70821

August 17, 1973

CHAIRMAN:
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Clay M. Bourg

EXECUTIVE DIRECTOR:
Sidney L. Gray

Mr. Edwin F. Drabowski, Project Manager
 Contract 8173
 Green Associates, Inc
 32 West Road
 Towson, Maryland 21204

Dear Sir:

A look at a topo map of our Region would make it obvious that we have an almost limitless need for fill material, but it is impossible to plan for dredged material until we know the conditions for delivery. When, where, how much, how far from source, cost, etc. are a few of our questions. With this information in hand, we could develop priorities on use and make the necessary environmental studies for the specific spoil areas.

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The following are answers to your specific questions:

1. There are plans before H.U.D. now for funding of a new town to be located adjacent to the Mississippi River. This area has an average elevation of about 15 ft. A regional airport is being planned. Although the site has not been selected, the best bet at this time is a swamp with an average elevation between 5 and 10 ft. It is immediately adjacent to the Intercoastal Canal and about 6 miles from the nearest point on the Mississippi. This airport will contain a minimum of 4,000 acres, most of which would need from 6 to 10 ft. of fill.
2. Yes, most definitely.
3. I am not sure we have any unique plans. The closest to unique would be for sanitary land fills for both domestic and industrial solid waste.
4. Timing and location is so important that it would be impossible to make even a ball park estimate on our yearly needs.

Mr. Edwin F. Drablowski

- 2 -


August 17, 1973

5. Enclosed you will find: our existing land use map; our future land use plan; and solid waste report, recommending hydraulic fill.
6. There is fill available from our northern tier of parishes. The major problem is cost of transportation.

We have asked our regional public works directors and parish engineers to develop specific needs and estimate quantity.

We would appreciate a copy of your study when it is completed.

Sincerely,



CHESTER H. JORDAN
Director of Planning

CHJ:fb

enclosures

7m
ROBERT L. HUCK & ASSOCIATES, INC.

RECEIVED

ROBERT L. HUCK, P.E.

DEAN C. MCKEE, P.E.

August 23, 1973

AUG 27 1973

CONSULTING ENGINEERS

CIVIL & STRUCTURAL

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabowski
Project Manager of Contract 8173
Green Associates, Inc.
32 West Road
Tolson, Maryland 21204

Re: Sanitary Landfill Projects using
Hydraulic Fill Material

Dear Mr. Drabowski:

Mr. Chester Jordan of the Capital Region Planning Commission in Baton Rouge, Louisiana, suggested that we contact you in regard to possible use of hydraulic fill material from the river and bayous.

Our consulting firm has done some research work in the use of hydraulic fill material for sanitary landfill projects. This concept has been discussed with Environmental Protection Agency in both Dallas, Texas and Cincinnati, Ohio. At one time we were considering securing a "Demonstration Grant" from E.P.A. and we were encouraged by their appraisal of the project.

In compliance with Mr. Kent Anderson's (Acting Chief of Collection and Disposal Branch, Office of Solid Waste Management Programs) request, we forwarded the enclosed information prior to submitting a preproposal package for a Demonstration Grant.

Upon adaptation of the "Louisiana State Solid Waste Plan", all open dumping will have to be discontinued. We believe that a project such as this would offer a economical solution to a municipality's solid waste problem.

Enclosed please find: a. Graphic sketch of project.
b. Objectives and Procedures for Sanitary Landfill Project.

If you desire additional information, please feel free to contact us.

Very truly yours,

Robert L. Huck
Robert L. Huck

RLH/md

Encl.

cc: Mr. Chester Jordan
844 MADELINE COURT • PHONE 926-5026

BATON ROUGE, LOUISIANA 70815

EFDP/w att
RAB
BS

DEMONSTRATION - SANITARY LANDFILL

PROJECT, USING HYDRAULIC FILL

OBJECTIVES:

To demonstrate that a regional solid waste problem can be solved effectively and economically in the high water table areas of the Gulf Coast by using hydraulic fill pumped from adjacent rivers and bayous to construct a model sanitary land fill. Since the trench method is impractical in regions such as this, an economical cover material must be imported. This project will further demonstrate a pattern of construction techniques and mode of operation in high water table areas. A resultant effect of using hydraulic fill will be to improve navigable channels which are continuously used for barge shipping.

PROCEDURES FOR CARRYING OUT OBJECTIVES:

Consulting engineering services will be furnished by Robert L. Huck and Associates, Inc., Baton Rouge, Louisiana. The cities and communities within the regional area will work together to secure the facts in the survey of sources and quantities of solid waste. The regional area will discontinue the open dumping and burning of trash. Referring to Grant No. D01-UI-0063 for the City of New Orleans, a like condition exists in this area. The existing landfills are not operated in accordance with accepted health standards owing principally to (1) lack of suitable conventional cover material in the area due to high water table and (2) leachates contaminating streams and bayous.

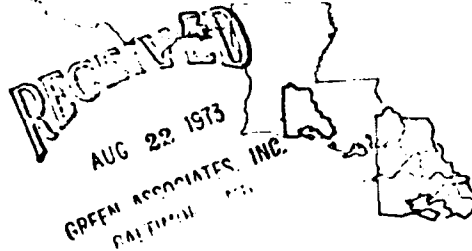
The project will be carried out in accordance with the following procedural outline:

1. Information will be collected concerning the sources, amounts, and characteristics of solid waste generated in the regional area and estimates made of amounts expected to be generated from 1972-1992.

2. Determine the location, size and availability of sanitary land fill site near a source of hydraulic fill material. An environmental evaluation will be made of the selected site. The environmental factors such as land use compatibility, accessibility, expansion potential, complaint potential, increased value of land, and future prospective uses of the land. Particular emphasis will be placed on land reclamation of low land areas.
3. Conduct topographic and soil exploration studies as needed for consideration to permeability, settlement, ground water, and subsurface geology.
4. Hydraulic fill material most commonly pumped from the bayous is a silty sand. This type of cover material does a good job in performing the functions necessary in a sanitary land fill. Enough hydraulic fill for 6 months to 12 months operation will be pumped to a stockpile on the site. A pipeline will be left in place and hydraulic dredges readily available in this area can supply the material when needed.
5. Control of leachates to prevent contamination of bayous - As necessary, dikes will surround and isolate the areas to be filled with refuse and will be constructed with impervious materials to prevent as much as possible subsurface seepage through them. The soils underlying the sanitary fill also must be relatively impervious.
6. The consulting engineer will prepare complete plans, specifications, engineering inspection, and operating requirement specifications.
7. Recommendations and guidelines for use of reclaimed lands will be made to the municipality in which the sanitary land fill is constructed.

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EXECUTIVE DIRECTOR

Evangeline Economic Development District



ROOM 100

LAFAYETTE PARISH COURTHOUSE

LAFAYETTE, LOUISIANA 70501

PHONE: (318) 233-3215

August 20, 1973

Mr. Edwin F. Drabkowski, Project Manager
Green Associates, Inc.
Engineers, Architects, Planners
32 West Road
Towson, Maryland 21204

8/23

Dear Mr. Drabkowski:

Your letter of August 10 has been turned over to me from Pat Killeen. From the general tone of the letter, I suspect that your primary concern at this time lies in determining the feasibility of using fill from dredged sources for various and sundry uses in areas which are not conducive to development for obvious physical reasons. Without doing any real serious thinking about this thing, I can think of at least a half dozen areas which could stand to be built up or "filled" for development purposes.

Needless to say, I am very interested in your study. Before answering your questions, let me inform you that our Comprehensive Planning Division, "Acadiana Planning and Development District," has been in operation only since October of last year (1972). As a result, we have completed only our first year's Work Program. We are now in year two of planning and we are now recognized by the State of Louisiana as Substate Planning District 4.

In reply to your questions:

1. As a regional planning agency, we have no short or long-range plans to develop areas that will require the need for fill. This is not to say that we will not have some in the near future. In our Housing Projections, which will be completed by June 1974, and in our Land Use, Transportation, and Recreation (open space) projections to be completed by June, 1975, we will have recommendations of this type included.
2. If fill material were economically made available, we most certainly could take into consideration its availability in doing future planning;

Rich
8/23/73
CK

THE LONG RANGE PLANNING AND ECONOMIC DEVELOPMENT ORGANIZATION REPRESENTING THE PARISHES OF:
ACADIA - EVANGELINE - IBERIA - LAFAYETTE - ST. LANDRY - ST. MARTIN - ST. MARY - VERMILION



THE LOUISIANA PLANNING AND ECONOMIC DEVELOPMENT ORGANIZATION REPRESENTING THE PARISHES OF
ACADIA - EVANGELINE - IBERIA - LAFAYETTE - ST. LANDRY - ST. MARTIN - ST. MARY - VERMILION

LAFAYETTE PARISH COURTHOUSE

ROOM 100

LAFAYETTE, LOUISIANA 70501

PHONE (318) 233-3210

Mr. Edwin F. Drabkowski, page 2
August 20, 1973

however, the acquisition, as you know, would be the responsibility of either the private developer or individual unit of government involved.

3. The following uses could be made of fill material in our area:
 - 1) Buildup of road base for Pre-Hurricane Evacuation Routes.
 - 2) Buildup of low-lying areas for housing sites.
 - 3) Proposed industrial sites.
 - 4) Proposed recreational and park sites in low-lying areas.
 - 5) Levee building.
 - 6) Development of agricultural land from swamp and marsh land.
 - 7) General highway construction.
 - 8) Airport runway construction.
 - 9) Earthen dams for reservoir constructions.
 - 10) Landscaping of public areas.
 - 11) Buildup for overpasses and bridges.
 - 12) Stockpile it for disasters and use as fill in sand bagging for areas threatened by flooding or high waters in general.
 - 13) Development of fertilizers.
 - 14) Bag it and sell it to tourists as "Authentic Mississippi Alluvium"
(A real "cajun" thought of this one)
4. It is difficult to determine at this time the amount of fill material that would be needed to meet demands. As I am sure you realize, this depends upon the type of use, the amount needed, the location, the cost and a host of other variables that would have to be considered.
5. I cannot supply you with future land use maps, because they are in next year's Work Program. We have only completed one half of our existing land use maps and can only send you photographs of those; because we are not going to the printers until the entire plan is complete. We have not completed a slope analysis, however, you can obtain USGS "topo." maps for the desired parishes by writing to:
Mr. Gerry Dyson
Louisiana Department of Public Works
Box 44155
Capitol Station
Baton Rouge, Louisiana 70804



THE LONG RANGE PLANNING AND ECONOMIC DEVELOPMENT ORGANIZATION REPRESENTING THE PARISHES OF
ACADIA - EVANGELINE - IBERIA - LAFAYETTE - ST. LANDRY - ST. MARTIN - ST. MARY - VERMILION

LAFAYETTE PARISH COURTHOUSE

ROOM 100

LAFAYETTE, LOUISIANA 70501

PHONE (318) 233-3215

Mr. Edwin F. Drabkowski, page 3

August 20, 1973

6. Yes, special problems are encountered on the local level in terms of a lack of landfills or construction materials. I personally am building a home right now and needed some 30 loads of dirt. After waiting for some 4 1/2 weeks, I was lucky to have purchased some dirt (of a hard clay pan nature) for \$16. per load.

I am enclosing xeroxed copies of each parish within our "APJ," that were included in our Interium Housing Analysis. The maps deal with soil quality in terms of new home site and subdivision development. After reviewing the maps, you will see why we are quite excited about the "Corps of Engineers" proposal. The white areas on the maps are totally inadequate for home site constructions.

If we may be of any further assistance, please let us hear from you. Also, please include us on your mailing list for the "finished " product.

Sincerely,

Gary P. LaGrange
Planner-In-Charge
Acadiana Planning Development
District

GPL/sjb

Enclosures: 7



GOLDEN CRESCENT COUNCIL OF GOVERNMENTS

P. O. BOX 2028 VICTORIA, TEXAS 77901 PHONE 512 578-1587

215 VICTORIA BANK & TRUST BUILDING

November 2, 1973

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NOV 5 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

I have made a sincere effort to find answers to some of the questions that you have asked in your letter of August 14, 1973. I am sorry that I have not responded more promptly. I will answer your questions as they were asked in this August 14th letter.

No. 1 - As a regional planning agency we do not have any short or long range plans to develop areas that require the need for fill at this time. Your request has stimulated a considerable amount of interest in this area and it will obviously be incorporated into our land use planning.

No. 2 - If fill material was readily and economically made available it would obviously be a consideration when planning for industrial, housing, agricultural, and recreational type developments. However, to say whether or not this fill material could be used would depend upon a considerable amount of study. Of prior concern would be to determine what loss there would be because a particular area was filled in. Various studies make it apparent that these low-lying areas that are suitable for fill contribute considerably to the ecology of the surrounding system.

No. 3 - In our planning area one possible unique use that could be made of this fill material would be to deposit this spoil into the dredged areas where shell dredgers have removed shell and have left a depression. Filling these depressions could alleviate some of the salt water intrusion that is occurring at this time. Again, there would have to be a considerable amount of study to determine the benefits and the effects of such filling processes.

No. 4 - I cannot speculate as to how much fill material can be used in future developments.

No. 5 - I would be most happy to supply you with a copy of existing land use, typography, slope analysis and future land use maps if these were available. Our planning activities have been underway for only about a year and a half and other priorities have forced us to just now begin considering land use planning.

No. 6 - Obviously most coastal areas have problems with finding landfills for solid waste disposal because of the high water table. Calhoun County is in the unfortunate situation at this time of having had their solid waste disposal area closed by the Texas State Health Department because of contamination of ground-waters. In the Port O'Connor area it is understood that a temporary site was chosen for the disposal of debris generated by a recent hurricane and this site has now become a more or less permanent dump area. This situation is not appreciated by the present landowner.

I have not received the response from those individuals that I sent a letter and a copy of your letter to. As I had anticipated, seems this is a busy part of the year and we are all extremely busy. I did make a couple of phone calls and found that the city of Port Lavaca negotiates with landowners along the bay front to dispose of any dredge spoils and are presently able to handle only that dredged material that is generated from Corps of Engineers maintenance dredging and limited amount of private dredging from their harbor of refuge area and private landowner area. The city does not have any long-term plans as far as disposal because at the present time their harbor of refuge area has a considerable amount of low-lying land that is suitable for disposal of spoils generated from maintenance dredging.

I did not contact the Aluminum Company of America to see what plans they have for the disposal of dredged spoils associated with their harbor maintenance dredging. A recent site inspection indicated to me that it was obvious that they are building up some of the low-lying areas with spoil material. I did not think to tell you to contact them during our last phone conversation as far as what plans they might have.

It cannot be emphasized too often that adequate consideration must be given to the land type that is lost due to the filling process. Low-lying coastal areas that appear worthless to the lay-public remains as one of those marginal areas whose total in-put into the ecology of the surrounding system has not been adequately evaluated and put into terms that allow comparison of what is lost and what will be gained because of filling.

I am sure this brief letter does not live up to what you anticipated receiving from us. At this time this is the best we can do. If I receive any more response from those individuals I requested such a response from then I will forward it to you immediately.

Respectfully,



Gary T. Damuth
Regional Planner

GTD:vf



**Coastal Bend
Council of
Governments**

International Airport
Corpus Christi, Texas 78408
512/864-3911

HAYDEN W. HEAD
chairman
ROBERT R. WEAVER
executive director

October 8, 1973

RECEIVED

OCT 11 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski, Project Manager
Greene Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

In response to a phone call from a Mr. Lee Moser, I am sending with this letter general land use, topography, and future land use maps.

Regarding the remaining questions you raised concerning the in-shore utilization of dredged material, I would like to continue to obtain responses from local officials on this matter and transmit their input.

Referring to your letter of August 10:

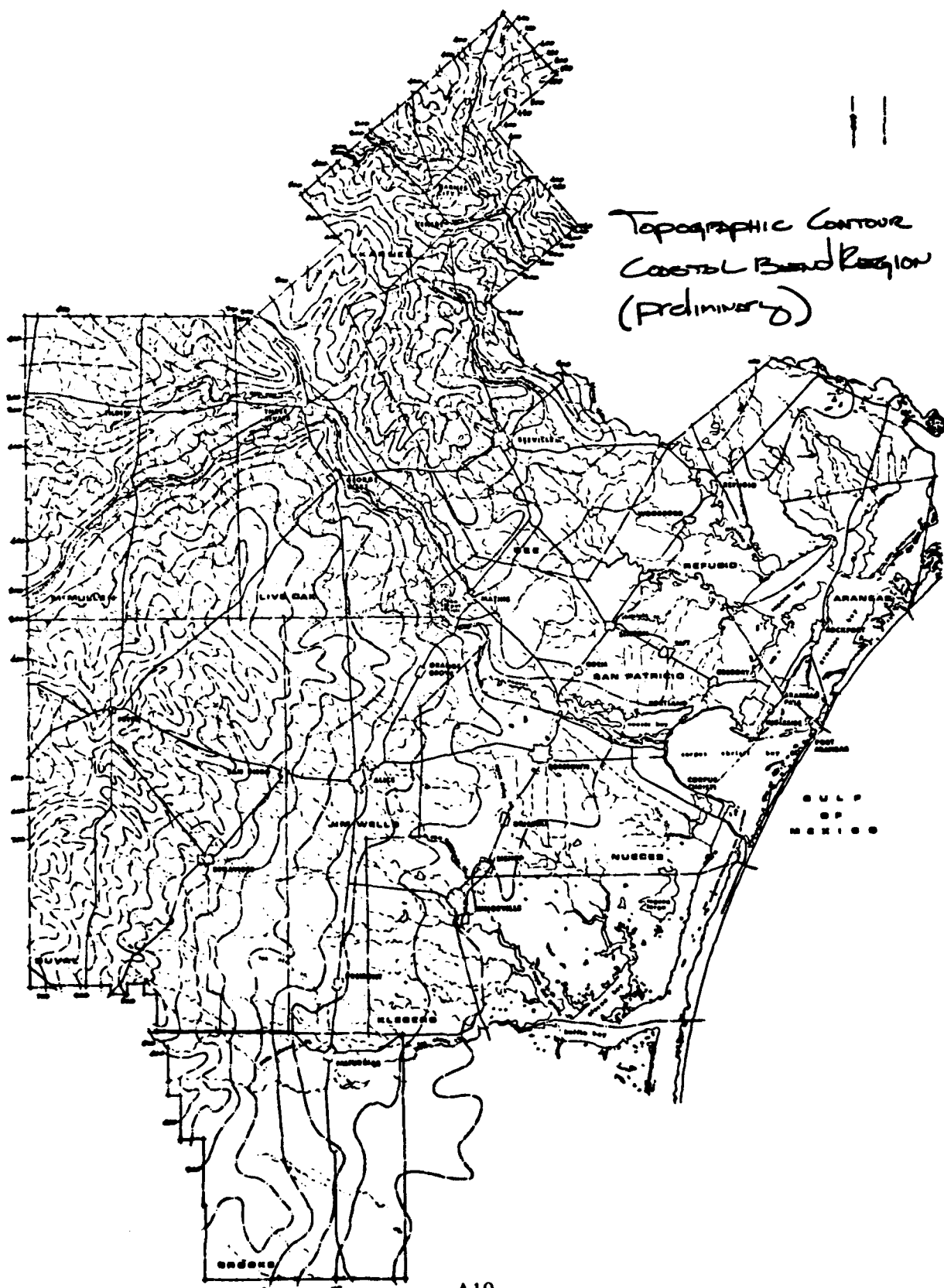
1. At the present time the Coastal Bend Council of Governments has no specific short- or long-range plans calling for possible use of fill.
2. Dredged fill inland might play a decided role--if properly handled--in urban site development, wherein it could be used to lift land areas above the level of shallow flooding, which frequently occurs in the flat coastal areas of the region ("sheet flooding").
3. Fill material might be used in creating "natural playgrounds when used to build artificial" mountains.
4. No estimates of dredged fill needs can be developed by us at this time.
6. Please refer to #2.

I hope these comments--subject to input from local officials--will be of assistance.

Sincerely yours,


John A. Franklin, III
Urban/Regional Planner

JAF:bt
Enclosures





RECEIVED

SEP 24 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD. STATE HIGHWAY ENGINEER
B. L. DEBERRY

COMMISSION

REAGAN HOUSTON, CHAIRMAN
DEWITT C. GREER
CHARLES E. SIMONS

TEXAS HIGHWAY DEPARTMENT
11TH AND BRAZOS
AUSTIN, TEXAS 78701

September 14, 1973

IN REPLY REFER TO
FILE NO. D-10R
720.32

8173

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

Reference is made to your August 31, 1973 letter regarding our possible use of material dredged by the U. S. Army Corps of Engineers along the coastal region.

Occasionally, we do have a need for suitable fill soils with which to construct highway embankments in our coastal districts. Generally, where the excavation required on our project is of insufficient quantity to construct the embankment, we specify "Delivered Borrow" material. Under the requirements of Delivered Borrow specifications the contractor is responsible to locate his own source of material with which to construct the highway embankment. In that event, any arrangement for disposal of the material would be directly with the highway construction contractors. These materials usually have some specification requirements for soil constants (Atterberg limits) and/or gradations which would have to be met.

In the event, the dredged materials were stockpiled within an economical haul distance of a project, the material met the mechanical properties required for

embankment material and its location was known during the design and plan preparation stage for the project it is quite possible that the stockpile could be set out in the plans as a required source. It is assumed that this material would be made available to the State on a "No Cost" basis.

In all probability the Texas Highway Department's only use for the material would be embankments unless, perhaps, there might be a case for landfill in maintenance warehouse or material storage areas.

The following are replies to the questions which you posed in the same numerical sequence as asked:

1. THD is not in the development business; therefore, this question is not pertinent to our operation.
2. Yes, for highway construction provided it met our specification requirements and could be used at a savings to the State.
3. Possibly not unique but for the construction of highway embankments.
4. Not applicable to THD operations.
5. We have no published reports relative to this. Estimates are made on a project basis during planning and more precise requirements determined when plans are prepared for an individual project. These quantities are determined by each field district for their particular projects.
6. Costs may be higher as, on occasion, materials must be shipped in where they are not available locally.

The Texas Highway Department operates on a decentralized system with 25 field districts and one urban office. Each of the District Engineers is responsible for planning, design, construction, supervision and maintenance of highways in his district. We have five districts and the Houston Urban office which are in the coastal region of Texas. No doubt each of these would be interested to know of materials which are or may be available in his area. A copy of this letter is being sent to those six engineers at the addresses on the attached sheet. If they have further input or information which they may desire you will no doubt hear from them.

We are always interested in learning of material sources which will enable us to provide better, more economical highways for the taxpayer and the traveling public. It is presumed that this is the information which you desire. If we can be of further assistance, please advise.

Sincerely yours,

B. L. DeBerry
State Highway Engineer

By: *Phillip L. Wilson*
Phillip L. Wilson
Engineer - Director
Planning & Research Division

Attachment

cc: Mr. Bob Carlisle
Parks & Wildlife Department
cc: Districts 12, 13, 16, 20, 21,
cc: Houston-Urban

District 12

Mr. Omer F. Poorman
District Engineer
Texas Highway Department
P. O. Box 1386
Houston, Texas 77001

District 13

Mr. Carl V. Ramert
District Engineer
Texas Highway Department
P. O. Box 757
Yoakum, Texas 77995

District 16

Mr. Roger Q. Spencer
District Engineer
Texas Highway Department
P. O. Box 7708
Corpus Christi, Texas 78415

District 20

Mr. Franklin Young
District Engineer
Texas Highway Department
P. O. Box 3468
Beaumont, Texas 77704

District 21

Mr. R. E. Stotzer, Jr.
District Engineer
Texas Highway Department
P. O. Drawer EE
Pharr, Texas 78577

Houston-Urban

Mr. William V. Ward
Engineer - Manager
Texas Highway Department
P. O. Box 187
Houston, Texas 77001

HGA
HOUSTON - GALVESTON AREA COUNCIL
P.O. BOX 22777 • HOUSTON, TEXAS 77027 • 713-827-3200

September 18, 1973

Received 9-24-73

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

I regret the delay in our response to your questionnaire; however, we were awaiting responses from local elected officials. This agency has not at this time been involved in any plan that will require need for fill. This finite activity would be beyond our scope and would be a local responsibility, i.e., city, county, etc. Therefore our response to your first question would be no.

With regard to question #2, we are experiencing a severe subsidence, particularly in heavy industrial and urban areas adjoining waterways. Within these areas, large quantities of fill would be most desirable. Fill would also be desirable to enlarge recreational facilities and related parking areas along Galveston Bay. In Galveston County (see attached letter from County Judge Holbrook) fill is most welcome, as the major area of the island requires elevation to be suitable for housing.

In addition to the above, it is possible that a further unique need for fill will result from subsidence and its effect upon hurricane/flood prevention levees, all of which must be raised as a result of subsidence.

In response to your fourth question, we have no means of quantifying the need for fill material.

I am also attaching a copy of our Regional Atlas, which contains land use maps for the region.

In regard to the coastal areas, it is no longer desirable, when subdividing, to dredge marshland, creating navigable channels and utilizing dredged material for fill, as this destroys the marsh as a value to the estuarine environment. Fill will be

Mr. Edwin F. Drabkowski
September 18, 1973
Page 2

required in large quantities to elevate such property behind
marshlands so that they will be suitable for housing development.

I hope this information will be beneficial to you in
your study.

Sincerely,


Charles M. Frost
General Planning Director

CMT/tg
Enclosures



THE COUNTY OF GALVESTON

201 COUNTY COURTHOUSE
GALVESTON, TEXAS 77550

RAY HOLBROOK
COUNTY JUDGE

September 6, 1973



Mr. Charles M. Trost
General Planning Director
Houston Galveston Area Council
P.O. Box 22777
Houston, Texas 77027

Subject: Fill Dirt for Galveston County

Dear Mr. Trost:

Thank you for your letter of August 16, 1973, concerning the use by Galveston County of spoil material from dredging.

Galveston County is in dire need of an abundance of spoil material in various areas of the County and will utilize all that the Corps of Engineers can possibly supply. We have many areas that could be used as recreational areas, such as Henderson Hole on the western end of Galveston Island, which, if not filled soon, may cut the Island in half. This area is south of FM 3005 and north of the beach on West Galveston off Seven-Mile Road.

There are many other areas too numerous to mention, especially on Galveston Island, but anything the Corps of Engineers can do to help will be greatly appreciated by the citizens of Galveston County.

If you should have any further questions, please let me know.

Sincerely,

Ray Holbrook
RAY HOLBROOK

RH/si



RECEIVED

SEP 4 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

August 29, 1973

PRESIDENT
DON CASH
Councilman
City of Beaumont

1st VICE PRESIDENT
PAUL E. HALE
Mayor
City of Orange

2nd VICE PRESIDENT
CARL "CROPO" LeBLANC
Councilman
City of Nederland

3rd VICE PRESIDENT
RAYMOND GOULD
Commissioner
Orange County

4th VICE PRESIDENT
PRESTON WOOD
Mayor
City of Bridge City

SECRETARY-TREASURER
LEROY MAHANEY
Councilman
City of Groves

LEGAL COUNSEL
GEORGE WIKOFF
City Attorney
City of Port Arthur

EXECUTIVE DIRECTOR
DON KELLY
3800 Highway 365
Port Arthur, Texas 77640
Telephone (713) 727-2384

P. O. Drawer 1387
Nederland, Texas 77627

Mr. Edwin F. Drabkowski, Project Manager
Green Associates, Inc.
32 West Road
Townson, Maryland 21204

Dear Mr. Drabkowski:

While this agency has little inhouse material upon which to draw in response to your letter of August 14, we have contacted several persons regarding potential uses and demands for dredged spoil material from the Army Corps of Engineers.

The views of the several city and county officials solicited were generally favorable. The uses to which the spoil might be put are several: landfill (sanitary and otherwise), roadbase material, and as a concrete mix. Each official, however, had reservations about the quality of the material and about delivery schedules.

Enclosed is a copy of our existing land use map and the 1990 land use map.

To the best of our knowledge there are no problems with the acquisition of fill materials at this time. The combination of land costs, our low elevation, and environmental controls means that we face a constant problem in obtaining adequate sanitary landfill sites.

We hope that we have been of some assistance.

Sincerely,

John B. Wasser
Director of Regional Planning

JBW:mb
Enclosure



RAY D. BASS
HIGHWAY DIRECTOR

STATE OF ALABAMA
HIGHWAY DEPARTMENT

MONTGOMERY, ALABAMA 36104

October 16, 1973

RECEIVED

OCT 23 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Attention: Mr. Edwin F. Drabkowski
Project Manager

Re: Dredged Spoil Study
Contract 8173

Dear Mr. Drabkowski:

In regard to your letter of September 19, 1973, we have made inquiry of various personnel within the Highway Department who have knowledge of landfill and construction requirements in the coastal regions of Alabama. Your organization has already been in contact with Mr. E. N. Eiland, Assistant Materials and Tests Engineer, about the specifications of such fill material so we will not repeat the specifications.

The following are answers to your suggested questions:

1. Regarding plans to develop or propose for development areas in the coastal region. Yes, we have proposed several highway locations in the Mobile area, but it is impossible to say at this time whether they will have a need for additional fill material.
2. If fill materials were made readily available at an economical price the Highway Department would have a use for such material.
3. The only use the Highway Department would have for fill materials would be for the construction of roadways through low swampy areas of Alabama.

4. There is no way at this time to tell how much fill material would be necessary for future construction.

5. The State of Alabama Highway Department has not published any report relating to the use or need for fill material in the coastal region.

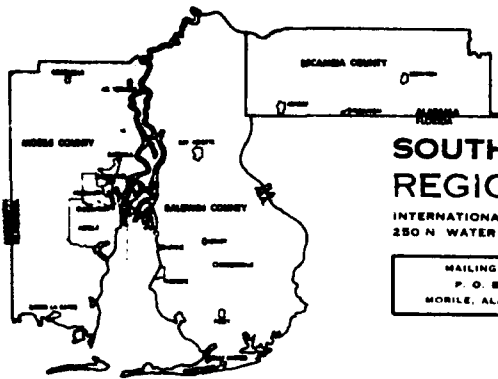
6. There are no special problems encountered because of a lack of construction fill material in the coastal part of the State.

Yours very truly,


Randolph Rowe, Research
and Development Engineer

JWK:HWB

File



SOUTH ALABAMA REGIONAL PLANNING COMMISSION

INTERNATIONAL TRADE CENTER
250 N. WATER STREET

TEL. 433-6841
AREA CODE 205

RICHARD D. PRUITT
EXECUTIVE DIRECTOR

MAILING ADDRESS
P. O. BOX 1688
MOBILE, ALABAMA 36601

NORMAN J. WALTON, CHAIRMAN
J. D. SELLARS, GENERAL VICE-CHAIRMAN
J. C. DAVIS, JR., PROJECT REVIEW VICE-CHAIRMAN
W. M. MCGOUGH, SECRETARY
OSBORN A. MONK, TREASURER

September 11, 1973

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, MD 21204

Dear Mr. Drabkowski:

This letter is in response to your request for information from Mr. Pruitt regarding disposal of dredge spoils in the Mobile area. Please consider the following information in specific response to your questions.

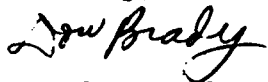
1. As a regional planning agency we do not presently have any short or long term plans to develop areas that will require the need for fill.
2. Yes, we probably could use such fill material if it would be readily and economically available in our area.
3. Two specific uses could be made of such fill material. The control of soil erosion and the fill of land areas for industrial development.
4. We have no idea at this time of the amount of fill material that would be used in future development.
5. Attached are copies of our existing land use, future land use, and topography maps.
6. A particular problem would be encountered locally in terms of the lack of land fill.

Mr. Drabkowski
September 11, 1973
Page 2

While this information may give adequate data to use in your study, I am sure that you realize the environmental aspects of dredging and land fill that must be considered in any operation of this magnitude. Especially here in the Mobile area there are proponents of environmental concerns that have considerable influence and whose views must be given some consideration.

I trust that this information is adequate for your purposes. Please call on us if we can be of future help.

Sincerely,



Donald W. Brady
Assistant Director

DWB/cf

Enclosures



STATE OF ALABAMA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

P. O. Box 108 - Dauphin Island, Alabama 36528

GEORGE C. WALLACE
GOVERNOR
CLAUDE D. KELLEY
COMMISSIONER
SIDNEY B. BLEDSOE
ASSISTANT COMMISSIONER

DIVISION OF MARINE RESOURCES
WILLIAM F. ANDERSON, DIRECTOR

September 26, 1973

RECEIVED

OCT 1 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
Thirty-two West Road
Towson, Maryland 21204

Dear Mr. Drabkowski,

In response to the question raised in your letter of September 19, 1973, I am qualified to answer only for the Marine Resources Division. Other divisions of our department may have need for a cheap fill material, i.e., Parks Division.

1. Our division presently has no need for fill material on the upland areas. We have requested that sand dredged from the outer bar of Mobile ship channel be used for beach nourishment. We also feel that material from new dredging could be used for this purpose, but not maintenance dredge spoil. We also feel that new channel spoil could be used to create oyster reefs (see page 16 of attached report). We also feel that the cost of planting the reef with shells for cultch material should be part of the project cost. However there is a limit to the amount of spoil which could be utilized in this manner due to competition for space by shrimp trawling activities.

2. I'm sure that the fill material could be utilized for all these purposes as the coastal elevations are low and any increase in elevation would make all these enterprises safer from flood damage. We are opposed to utilization of this material in any wetlands. Agricultural use would depend on whether the salts could be leached out of the material in a relatively short period.

3. See No. 1 regarding oyster reef construction.

4. ??? Beach nourishment could utilize all available suitable (sand) material. Oyster reef construction would be limited to less than 5,000,000 cubic yards.

Mr. Edwin F. Drabkowski

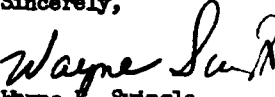
Page 2

September 26, 1973

5. See attached federal aid report.

6. All housing is required to be above eleven feet elevation to qualify for flood insurance. Many of the upland areas are well below this elevation.

Sincerely,


Wayne E. Swingle
Chief Marine Biologist

WES:sbh

Enclosure



George C. Wallace
Governor

STATE OF ALABAMA
ALABAMA DEVELOPMENT OFFICE

October 1, 1973

R. C. "Red" Bamberg
Director

W. M. "Bill" Rushton
Assistant Director

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

RECEIVED

OCT 4 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Dear Mr. Drabkowski:

In response to your letter concerning the use of dredged materials as a resource, we can only answer in generalities at this point. We do not, as an organization, get involved in the construction of facilities and, hence, have no need for the engineering data that would contain the requirements for fill material. However, we can inform you of some major projects that could possibly utilize fill material.

One is the Ameraport project (superport), which includes not only a monobuoy and undersea pipelines, but a major tank farm on shore. The tank farm has not been sited, so it is not known whether there would be any requirements for fill. Should the Ameraport project come to fruition, we would expect that in the Alabama-Mississippi area there would be at least three major refineries constructed. The construction of these refineries could, possibly require the use of fill material.

The Uranium Enrichment project is another major undertaking and depending on the site finally selected, could be a potential for use of dredged materials.

Additionally, the State is quite active in major industrial development activities with emphasis on water oriented facilities which, again, would require possible fill material.

While this information is certainly not approaching the answers to your questionnaire, it does, however, serve to alert you to some possibilities and, hopefully, the information will be useful.

Sincerely,

C. L. Melenzyer IV

C. L. Melenzyer IV
Director
Policy Studies Division

/r

STATE OFFICE BUILDING • MONTGOMERY, ALABAMA 36104 • (205) 269-7171



MISSISSIPPI STATE HIGHWAY DEPARTMENT

P. O. Box 1850 Jackson, Mississippi 39205

September 28, 1973

Reply To

RECEIVED

OCT 1 1973

**GREEN ASSOCIATES, INC.
BALTIMORE, MD.**

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

Subject: Dredged Spoil Study - Your Contract 8173

This is to reply to your letter dated September 19, 1973, concerning the subject research study you are doing for the U. S. Army Corps of Engineers Waterways Experiment Station in Vicksburg, Mississippi.

Taking your questions in order as they appeared in your letter, we are offering the following answers:

1. When we build highways the location often involves cuts or fills. Therefore as long as we are constructing highways, we will always have need for fill materials.
2. The material will have to meet the Department's specification and the timing for the material to become available needs to be skillfully coordinated, so the construction will not be interrupted. Our specification, as required by the Federal Highway Administration, allows only the Contractor to furnish his own pit materials. The Department has no authority to tell the Contractors where to get these materials. Therefore the price of the "new" fill material must be comparable with that of the material the Contractors are now using. If hydraulic methods are needed to transport the dredged spoil material, special provisions have to be worked on with the Environmental Agency for possible water pollution problems.

-more-

Mr. Edwin F. Drabkowski

-2-

September 28, 1973

3. Highway embankment.
4. Any future use would also be highway embankment. The amount is very difficult to estimate at this time.
5. No, the earth quantities are usually calculated after the selection of the final location of a proposed highway route. The selection of the final location is often a very time consuming procedure. It involves public hearings, court hearings and the investigation and preparation of Environmental Impact Statements.
6. To the best of our knowledge, we do not have any special problems because of a lack of landfills or construction materials.

To summarize our opinion, we think the key to the successful utilization of dredged spoil material for highway construction lies in the timing and proper coordination between the producing and consuming agencies. Provides, of course, the material meets the construction specification and is economically feasible. *

Hope our answer can be of some help to your study.

Sincerely,

T. C. Paul Teng for
H. V. Mahan
Research and Development Engineer

TCT:ms

cc: Mr. R. W. Thomas
Mr. Buford Stroud

GULF REGIONAL PLANNING COMMISSION

SERVING PEARL RIVER, HANCOCK, HARRISON AND JACKSON COUNTIES OF MISSISSIPPI

POST OFFICE BOX 1348
GULFPORT, MISSISSIPPI 39501

TELEPHONE (601) 864-1167

RECEIVED

SEP 1 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

September 25, 1973

Mr. Edwin F. Drabkowski, Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204


Dear Mr. Drabkowski:

Subject: Dredged Spoil Study - Inquiry of August 21, 1973
Your Contract 8173

Your correspondence presented six questions concerning potential use of dredged spoil in our south Mississippi Coastal Region. We prepared replies to these six questions and as you requested, the Municipal and County Governments within our area of jurisdiction were sent copies for review and comment. To date, two Mayors (Bay St. Louis and Pass Christian) and one County Board (Jackson County) have concurred with our views.

The replies to your six questions, enumerated to coincide with your questionnaire, are attached. In the event we receive additional information from other governmental units, such data will be forwarded to you.

Sincerely,


A. Paul Desmarais
Deputy Director

APD/gt

Attachment

GR
PC

REPLY TO QUESTIONNAIRE CONCERNING POTENTIAL USE OF DREDGE SPOIL

1. On a regional scope, development of the low lying areas of the region along the coastal reaches and along the major streams is controlled by the Coastal Wetlands Protection Act of 1973, Mississippi State Legislature. In this respect, future growth is being directed away from such low lying areas. In the last 10 years, about 2,000 acres of prime marshlands have given way to industrial-commercial-residential development. Much dredged spoil was utilized for such activities. If this practice were to continue (which is unlikely now), dredged spoil would be in demand. Therefore, we do not foresee the need for such volumes of spoils, as previously indicated, to develop areas within the region.
2. The answer above addresses the major portion of this question but with respect to recreation, sand beach replenishment has been an expensive operation in the past. Just this past year, the Harrison County Development Commission spent nearly \$2 million to replenish about 26 miles of beach. The frequency of hurricanes and excessive high winds and tides is a major cause of beach erosion. If fill material was readily and economically made available, the beaches along Jackson, Harrison, and Hancock Counties could be maintained more economically.
3. Fill materials could probably be used in road construction and for sanitary landfills. Such materials would have to satisfy the Mississippi Standard Specifications for Road and Bridge Construction, 1967 Edition for State Roads. In terms of sanitary landfills, some sites are utilizing abandoned gravel and/or sand borrow pits. Since the solid wastes deposited should be covered daily with earth cover, dredged spoils could possibly be utilized. There are probably other abandoned borrow pits within the region but these data are not presently available.
4. Unknown at this time.
5. Yes, see attachments. (Attachments under separate cover).
6. None are known by us at this time, but good fill is presently available for \$1.35 per cu. yd.

Received
Sept. 10, 1973

SOUTHERN MISSISSIPPI
PLANNING & DEVELOPMENT
DISTRICT



Box 2957
Hattiesburg, Mississippi 39401
Telephone (601) 544-2321

August 30, 1973

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

Since receiving your letter dated August 21, 1973, I have conducted limited research as to the possible usage of the dredged spoils within the Southern Mississippi Planning and Development District. It appears we do have a definite need for large quantities of fill to upgrade unproductive land not presently being used.

For example, farmers owning large tracts of land have indicated a tremendous need for fill to place existing poor lands in production. However, the farmer will not have the financial capability of paying for delivery of the fill within the stipulated 100-mile radius.

It is felt that materials of this magnitude would be most gratefully accepted and utilized by the farmer; hence, boosting agricultural production within the District which, in turn, would have a positive effect on the entire economy.

Although we do not have a detailed existing land use at the present, I am forwarding copies of our generalized land use maps.

As indicated, the need and desire for the 30.2 million cubic yards of dredged spoils does exist. Therefore, the Southern Mississippi Planning and Development District wishes to assure you and your firm that we will coordinate in any manner required to assure the complete utilization of the fill.

Ed,
many local Governments have
expressed a real desire to
utilize this fill material. If
you wish us to do a more
detailed analysis, let us
know.
Enclosures

Sincerely,

Leslie Newcomb
Executive Director

MISSISSIPPI

RESEARCH AND DEVELOPMENT CENTER

RECEIVED

OCT 29 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

October 23, 1973

Mr. Edwin F. Drabkowski, Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

In response to your letter of September 19, spoil material has many potential uses in Mississippi, including industrial site development and development of sand beaches for recreational use.

Industrialists wish to locate plants along our navigable waterways, especially the Mississippi River. Most of these potential sites are below the 100-year flood level, but fill material could be used to raise the flood level and thereby make these areas suitable for industrial development. For example, the Vicksburg Chamber of Commerce is considering the purchase of a piece of property along Highway 61 for an industrial site. Fill material would raise the flood level of this low-lying area and make the site more attractive to industrial prospects. A sketch of this proposed site is attached.

Mississippi does not have a land use plan which delineates areas suitable for filling. Neither has our staff pinpointed such lands except in the Vicksburg area. Local development agencies throughout the State will probably be able to provide additional information on other areas which may benefit from filling. The enclosed copy of Mississippi Industrial Developers Directory should be helpful to you in contacting these groups.

Another potential use of spoil material in Mississippi is the development of sand beaches for recreational purposes. Three water development districts located throughout the State are currently developing most water-related recreation projects. I recommend that you contact these agencies at the enclosed addresses for additional information.

When you have located areas where spoil material will be available, we may be able to provide you with more information on possible uses. I am very interested in your study and would appreciate a chance to review it when near completion. I hope this information will be of assistance to you.

Sincerely,



Kenneth J. Goodwin, P. E.
Manager
Community Development Division

KJG:sk

Enclosures

P. O. DRAWER 2470 JACKSON, MISSISSIPPI 39205 (3825 RIDGEWOOD ROAD) PHONE 601 982 6110



Hackensack Meadowlands Development Commission

1099 WALL STREET WEST • LYNDHURST, NEW JERSEY 07071 • (201) 935-3250

LAWRENCE F. KRAMER
Chairman

WILLIAM D. McDOWELL
Executive Director

November 29, 1973

RECEIVED

DEC 3 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Thomas L. Watchinsky
Green Associates, Incorporated
32 West Road
Towson, Maryland 21204

Dear Mr. Watchinsky:

As we indicated in our meeting of November 26, 1973, the Commission is interested in exploring further the various possibilities and implications for the possible use of dredged material in the Hackensack Meadowlands District. Our interests can be divided into the following categories:

- (1) The possible use of hydraulic fill as a landfill fire preventive technique. Pumping hydraulic fill into an existing inactive landfill site may serve the purpose of filling internal voids, which may at times become the origins of underground combustion.
- (2) The use of such materials as eventual cover for presently active landfills, which cover would underlie a final layer of topsoil. As we mentioned, a number of the existing landfill sites are planned as future park sites.
- (3) The possible use of such materials over inactive and presently active landfills as a possible surcharge material, upon which eventually some form of construction might occur.

We must point out again, however, that we have environmental and engineering reservations concerning how these filling operations might be conducted. The following problems will require resolution before we could give final endorsement to the above proposals in the Hackensack Meadowlands:

Mr. Thomas L. Watchinsky

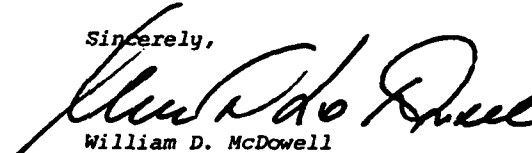
- 2 -

November 29, 1973

- (1) Adequate diking and ditching would be required to guarantee protection against vertical and horizontal migration of the leachate, which will be generated in the landfill sites.
- (2) Slurry water will have to be processed prior to discharge to the waterways, in order to meet minimum water quality requirements.
- (3) Special processing may be required to insure against contamination of the marsh/estuary food chain by toxic heavy metal concentrations.

In sum, we are naturally interested in your work, and we are plausibly a potential user, providing engineering and environmental parameters can be met.

Sincerely,



William D. McDowell
Executive Director

/jo

CLYTON E. MOORE
SECRETARY

RICHARD A. HARRIS
DIRECTOR OF HIGHWAYS



RECEIVED

OCT 12 1973

DIVISION OF HIGHWAYS
P. O. BOX 778, DOVER, DELAWARE 19901

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

October 4, 1973

Wilmington Metropolitan Area
Planning Coordinating Council
2062 New Castle Avenue
New Castle, Delaware 19720

Att: Mr. Edward J. O'Donnell
Director

RE: Corps of Engineers
Dredge Spoils

Gentlemen:

I am in receipt of your memorandum dated August 28, 1973, along with Green Associates, Inc. letter to you dated August 21, 1973, regarding their Dredged Spoil Study. Our response to the six questions posed is as follows:

1. The Division of Highways has under consideration short and long range plans for coastal area roadway stabilization projects such as Augustine Beach in New Castle County, and Woodland Beach and Port Mahon in Kent County.
2. If fill material was readily available, this availability would govern the design approach of the projects listed above where causeways are experiencing excessive erosion and continual waterway encroachment. The utilization of these fill areas would be for recreational activities and would be under the auspices of the Division of Parks, Recreation and Forestry.
3. This fill material can be used for the reestablishment of marsh areas and embankment stabilizations adjacent to causeways.

OCT 1 1973

Wilmington Metropolitan Area
Planning Coordinating Council
October 4, 1973
Page 2

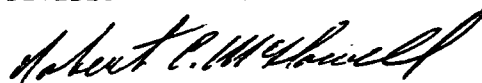
4. The quantity of fill material required for proposed projects would depend on future funding and the establishment of priorities.
5. Future land use maps can be secured from the appropriate county planning commissions.
6. Special problems are encountered in Kent County due to the lack of Borrow Type B.

In regard to the present use of fill or dredged spoil material, Contract 72-09-007, Woodland Beach Causeway Stabilization, was advertised on September 25, 1973. This improvement consists of dredging, filling, diking and the restoration of embankment; the construction of spillways, silt barriers, etc.

The Port Mahon Road Stabilization project should be advertised in 1973. This improvement consists of the placement of sheeting 90' from roadway centerline and filling and establishing a ground cover in that area. A project of a similar design is anticipated next year at Augustine Beach to prevent further embankment erosion.

Very truly yours,

DIVISION OF HIGHWAYS



Robert C. McDowell
Bridge Engineer

RCMcD:cs

cc: Mr. R. D. Bewick, Jr.
Mr. J. J. Schuh



NEW CASTLE COUNTY
DELAWARE

DEPARTMENT OF PLANNING

COUNTY ENGINEERING BUILDING • ROBERT KIRKWOOD HIGHWAY
2701 CAPITOL TRAIL, NEWARK, DELAWARE 19711 • 787-4100 AREA CODE 302

RICHARD M. BAUER
DIRECTOR OF PLANNING

September 26, 1973

RECEIVED

SEP 28 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

In response to your letter of August 29, 1973, the New Castle County Department of Planning would like to submit the following responses to the six questions raised in your letter:

Question 1. With the possible exception of sanitary landfill cover material, the County does not have any short term or long term plans that would require the use of dredge spoils.

Question 2. Yes. New Castle County could use spoil material. Specific uses would depend on the composition of the dredged material and on how the material would compact.

Question 3. Dredged material with the characteristics of select and special borrow can be used in road projects and backfill applications.

Question 4. It is impossible to estimate the amount of fill that can be used in future developments. A major input would be the quality of the material; the costs involved, such as transportation and refinement of dredged material; and general competitiveness of the spoil material with local borrow.

Question 5. Existing land use maps for New Castle County were compiled during the period 1968-1971. The information has been prepared at 1" = 800'. The material has not been published. The future land use maps are in some stage of preparation or adoption. A copy of the topographic maps for New Castle County is available.

Mr. Edwin F. Drabkowski
Page 2
September 26, 1973

Question 6. The Department feels that there are some local problems in terms of lack of landfills and construction materials. Strategically located select and special borrow are rapidly becoming depleted. Where sources remain, urbanization is making them inaccessible.

In addition to the six questions, the Department would like to make the following comments:

1. Because of the location of dredging operations, it is felt that the development of an aggressive program to use spoils will result in pressure to fill marshes and floodplains.
2. Based on visual examination of spoils areas along the Chesapeake and Delaware Canal, erosion and sediment control appear to be a problem. In addition, we have information that spoils in this geographic area are acidic, making the establishment of ground cover difficult.
3. How will the material which has no economic value as fill be disposed? A long range spoil disposal plan should be developed for this type of material. The plan should identify spoils disposal sites for both the Corps and other public and private disposers. An Environmental Impact Statement should be prepared for this plan and submitted for public review through the metropolitan and State clearinghouse process.

If you have any questions or require any further information, please do not hesitate to contact me.

Sincerely,

Vincent P. D'Anna

Vincent P. D'Anna
Planner IV

VPD/cac

cc: Peter M. Ross
Jorene Coffay
Edward J. O'Donnell
Merna Hurd

DELAWARE VALLEY



REGIONAL PLANNING COMMISSION

Penn Towers Building, 1819 J.F. Kennedy Blvd., Philadelphia, Penna. 19103 LOcust 7-3000

October 12, 1973

RECEIVED

OCT 15 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Green Associates, Inc.,
32 West Road
Towson, Md. 21204

Re: Dredged Spoil Study
Your Contract 8173

Dear Mr. Drabkowski:

I am writing in response to your request of August 17, 1973 concerning the disposal of dredged spoils in the Delaware Valley Area. I have been extremely busy during the past four to six weeks and was not able to promptly respond to your request for information. I trust that, although late, the information will be most helpful in your work.

My specific comments follow, numbered in accordance with the questions asked in your letter.

1. DVRPC has prepared and adopted a long range comprehensive plan for the region. (See Enclosure 1.) The plan specifically addresses Land Use, Transportation, Open Space, Water Supply and Water Pollution Control goals, projected needs, existing and proposed facilities, management and intergovernmental arrangements. The plan's focus is in most cases at the macro (systems) level and not at the micro (project) level. For example, the Transportation Plan refers to highway corridors and the Water Pollution Control Plan refers to trunk line or interceptor routes.

In order to evaluate project site requirements (foundation, excavation, fill, etc.) it is necessary to do planning at the preliminary engineering level. Since our Plan is not to that level of detail, the staff has not evaluated the need for fill material in the region.

2. It has been proposed, in this year's work program, to update the Regional Plan on a sub-area basis. The proposed level of detail for this work is very similar to preliminary engineering. If this updating procedure is used, the staff would certainly consider the use of readily available and economic fill material in future planning.

October 12, 1973 pg. 2

Mr. Edwin F. Drabkowski

3. The following potential uses of fill material exist in the Delaware Valley:

a. Preparation of land for development.

There are sand and gravel quarries, wetlands and marsh areas in the region which could be filled and used for residential, commercial or industrial development.

In addition, Philadelphia has proposed to develop a riverfront park along its 10 to 15 mile Delaware River waterfront by filling certain areas between its pierhead and bulkhead line. This would require extensive quantities of fill material.

b. Cover for existing and future sanitary land fills.

c. Resource inputs to concrete production depending on coarseness.

d. Glass production depending on silica content, coarseness and water content.

e. Agricultural soil reconditioning depending on organic content and chemical composition.

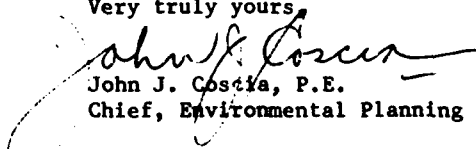
4. Future fill material requirements for the region have not been developed at this time.

5. You can order the following publications directly (Order form enclosed.)

- (1) 1 inch to 2 mile map of Topography - (\$4.00)
- (2) 1 inch to 2 mile map of Steep Slopes - (\$4.00)
- (3) Regional Land Use Plan - (\$3.50)

6. I am not aware of any local problems in terms of a lack of land fills or construction material.

Very truly yours,


John J. Costa, P.E.
Chief, Environmental Planning

JJC:rs

Enclosures (2)

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THOMAS P. SHELBURNE, Vice President
STUART F. PIPHER, Secretary
FRANK L. WILLIS, Treasurer and
Vice President of Fiscal Affairs

HOWARD J. GROSSMAN, Executive Director



October 8, 1973

RECEIVED

OCT 12 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, MD 21204

Dear Mr. Drabkowski:

Re: Your Dredged Spoil Study (Contract 8173)

Below you will find my responses to the questions which you raised in your August 14, 1973 letter to me.

1. Although we, as a regional planning agency, do not have any specific long range plans to develop areas that will require the dredged spoil we believe there are significant uses for this type of material in our seven-county area. Some of the potential uses include: the use of this type of material (if it is clean) to reclaim the numerous strip pits and coal spoil bank areas we have in our region; the utilization of this material to fill various highway oriented problem areas to allow for better drainage; and the possible use of this material in some of the proposed urban renewal areas that require additional fill to bring them above the 100-year flood plain and also in several sanitary land fill pits. Needless to say, however, the use of any material of this type in our area should be closely monitored by the various environmental regulatory agencies to insure that it would not create any health or environmental problems in our region. This would be especially true in respect to toxic minerals that might pollute the ground water table.
2. We believe that if clean fill material was already available and could be transported to our region in an economical way, we could use significant amounts of such material in the creation of new industrial sites, residential areas and possibly even the mixing of this material with existing spoils and culm banks to produce new land resources and possibly even turn some of this wasteland into productive agricultural uses; for example, tree farms, nurseries, and possibly even feed-lots to serve the northeastern United States.

Serving Carbon, Lackawanna, Luzerne, Monroe, Pike, Schuylkill and Wayne Counties

Mr. Edwin F. Drabkowski
10/8/73
Page 2

3. As stated above we believe that there could be several unique ways to use good fill material in our area including the possibility of flushing some of this material into the mines to stabilize the surface if it was clean and would not adversely affect the ground water supply. We could also use it in regard to extensions to airport runways and as I stated earlier in possibly raising some of the land in the general vicinity of our rivers and creeks within the region to allow for more productive and meaningful development in close proximity to them.
4. In response to question number four, we at this time do not have any definitive information on how many cubic yards or tons of this material would be necessary, but it would appear to us from a very superficial viewpoint that it would be in the neighborhood of several hundred million yards depending upon the type of fill and the proposed uses.
5. At the present time, we are developing existing land use, slope and future land use maps for our seven-county area. I believe you can receive the topographic sheets from USGS. We have some copies available here at one inch equals two miles, etc., but we believe more definitive information is available from USGS. I would also like to bring to your attention that several significant studies have been done in Northeastern Pennsylvania by the Mitre Corporation of McLean, Virginia relative to the possible uses of spoils in Northeastern Pennsylvania for the Department of Interior. Also, several other significant studies have been done by Arthur D. Little in regard to this particular subject matter for the U.S. Army Corps of Engineers in the past; and we are currently working in close cooperation with the Appalachian Regional Commission, the Pennsylvania Office of State Planning and Development, and several other consultants in a series of pilot programs to reclaim some of this land in Northeastern Pennsylvania. The material we have in our offices is too voluminous to reproduce at this time, however, if you would want to review the outlines of these proposals, we would be more than happy to make them available in our offices for your inspection and also to give you a status report on them.
6. There are some potential problems which you might encounter locally in Pennsylvania and specifically in our region. As you may be aware, there has been significant resistance to the rail hauling of solid wastes into our region from the Philadelphia metropolitan area. Although the Council doesn't necessarily concur with most of the negative responses to this proposal, we believe that any substantial transportation of waste or dredged material into our region should be preceded by a regional educational program and significant ground work to make the proposition acceptable to the general citizenry, environmentalists, and the local political leaders. In fact, I would like to take this opportunity to express our desire to meet with you in the future to discuss the possibilities of how we may cooperatively work with the Army Corps of Engineers, the Pennsylvania Department of Environmental Resources, the Environmental Protection Agency, and possibly you, if you are chosen as a consultant, in the development of a demonstration program on how this type of material might be utilized in reclaiming the spoil banks, etc. I believe that such a national demonstration project could be authorized under the National Resources Recovery Act.

Mr. Edwin F. Drabkowski

10/8/73

Page 3

I trust that this material will be helpful to you and we will be looking forward to meeting you in person relative to some of the matters discussed above to ascertain the feasibility of generating a program such as is outlined above in our region. In closing I would like to thank you for your courtesy and patience relative to our response to your request.

Yours truly,

A handwritten signature in dark ink, appearing to read "Howard J. Grossman". The signature is fluid and cursive, with the first name "Howard" and last name "Grossman" clearly distinguishable.

Howard J. Grossman
Executive Director

HJG:rac

JOINT PLANNING COMMISSION LEHIGH-NORTHAMPTON COUNTIES

ALLENTOWN-BETHLEHEM-EASTON AIRPORT
LEHIGH VALLEY, PENNSYLVANIA 18103

CODE TELEPHONE
215 264-4844

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JAMES A. HEMSTREET

October 12, 1973

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Re: Dredged Spoil Study
Contract 8173

Dear Mr. Drabkowski:

In response to your letter, I am enclosing a topographic map of our region, a copy of the Regional Comprehensive Plan, and a map showing abandoned quarry sites. We do not have existing land-use maps which can be readily reproduced.

We do not make any short or long range plans that will require the need for a great amount of fill material. However, there is one unique use of fill material which might be used in our area. As you can see from the enclosed map, there are several hundred abandoned slate and limestone quarries in our region. It seems to me that fill material could be used in some of these cases to reclaim the scarred landscape. I have no way to estimate how much fill could be used in this process, but I am sure it is many million cubic yards. I offer this only as a possibility, for we have no plans for any large-scale reclamation projects.

We have recently completed a solid waste management plan. This included a survey of existing disposal capacity and a projection of needed disposal capacity. The capacity of existing sanitary landfills is generally adequate to handle solid waste generated in our region and a few new facilities which will be needed are planned. However, there is certainly no extreme excess of capacity in

Mr. Edwin F. Drabkowski
October 12, 1973
Page 2

sanitary landfill. Therefore, I would think that it would be highly undesirable to use our existing sanitary landfill capacity for disposal of dredged spoil.

I hope this information aids you in your study.

Very truly yours,

Allen R. O'Dell

Allen R. O'Dell
Senior Planner

ARO/lr
Enclosures

city view development inc.

232 EAST MARKET STREET • YORK, PENNSYLVANIA 17403

September 10, 1973

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

RECEIVED

SEP 12 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

RE: Dredged Spoil Study - Contract 8173

Dear Ed:

As you are aware, Mr. Reed J. Dunn, Executive Director of the York County Planning Commission, asked for my reaction or response to the questions outlined in your letter addressed to Mr. Dunn of August 14, 1973.

You indicate you are charged with the consideration of dredged materials as a resource. My first response is that "yes" I feel I may have an idea as to the utilization of dredged spoil as a resource. However, I would need to know the physical and chemical properties of the spoil, by volume and location prior to being able to make the appropriate evaluation of the idea.

My second response is geared to the possibility of the use of the spoil as a fill material. I am going to make the assumption that most of the owners of previously worked quarries in the York area are not interested in buying clean fill to refill their quarry sites. I do feel, however, that a sizeable number of quarries could be located and used as disposal sites. The problem as I see it is to evaluate the relative financial and environmental advantages of land fill versus present disposal methods. Finally, you need to develop a financial incentive in order to persuade the quarry owners to make their quarries available for disposal sites.

The J. E. Baker Company, of which City View Development Inc., is a subsidiary, presently owns three quarries which could possibly be considered for disposal sites. The three quarries all have rail access and combined would need 6.8+ million cubic yards of fill. These figures are given only as a small indicator of the potential disposal capability which exists in south-central Pennsylvania.

Edwin F. Drabkowski,
Project Manager

September 10, 1973

RE: Dredged Spoil Study

If I can be of any further assistance, please contact me. Also, if you can supply me with the above indicated chemical-physical description of the dredged spoil, I will proceed to evaluate my idea more closely.

Sincerely,



Larry E. Flemmens
Manager - Land Development

cc: Reed J. Dunn
Thomas J. Cummings

L
Lower

A
Anthracite

R
Regional

E
Economic

D
Development

O
Organization, Inc.

FFD

P. O. BOX 354 - MT. CARMEL, PA. 17851

- or -

OFFICERS

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Kulpmont - 648-2266

Vice President - J. Edward Ludes
Coal Township - 848-6803

Treasurer - William McLaughlin
Ralpho Township - 644-0861

Secretary - Leonard J. Akelaitis
Mt. Carmel - 339-2930

August 22, 1973

RECEIVED

AUG 27 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Executive Director
David C. Keiter
717-339-5423

Mr. Edwin F. Drabkowski
Green Associates, Inc.
32 West Road
Towson, Md. 21204

Dear Mr. Drabkowski:

I am writing in response to your letter of August 14 concerning possible use of fill material from dredged sources. At present I know of no use of fill from dredged sources in this area. However, fill from the numerous coal mine refuse banks is being used as fill, both in small landfill operations and in backfilling of strip mining activity.

I would not foresee much for dredged spoil material in this area because of the extremely large amount of spoil material from mining activity presently heaped up around the area and causing visual, water, and air pollution. A study conducted by Penn State showed that in our 13 municipality area, there are 39 major culm banks containing 145,260,000 cubic yards of material. This does not even count the smaller banks which might contain another 50,000,000 cubic yards of spoil.

This material has the disadvantage, however, of not being fertile. Therefore I would like to see if it might be possible to mix this mine waste with the dredged spoil to see if a better fill material would result. We have 1153 unfilled strip pits that our organization has been attempting to have filled for over 5 years. We even have the fill, but the areas will remain scars as little will grow in it. Perhaps if our material could be mixed with dredge spoil a better fill material than either separately would result; this might also enable us to find a market for some of our unsightly culm.

COMMUNITIES REPRESENTED

COLUMBIA COUNTY (2,302)

Centerville Boro (1,165)
Conyngham Township (1,137)

Coal Township (11,781)

East Cameron Township (851)
Marion Heights (958)

NORTHUMBERLAND

Kulpmont Boro (4,026)

Mt. Carmel Boro (9,317)

Mt. Carmel Township (2,802)

COUNTY (47,918)

Ralpho Township (2,476)

Shamokin City (11,719)

Shamokin Township (1,870)

West Cameron Township (328)

Zerbe Township (2,196)

REPRESENTING OVER 50,000 PEOPLE

L

Lower

A

Anthracite

R

Regional

E

Economic

D

Development

O

Organization, Inc.

P. O. BOX 354 - MT. CARMEL, PA. 17851

Mr. Edwin F. Drabkowski

-2-

August 22, 1973

Penn State has done a study on the possible uses of anthracite refuse which you might find helpful. It is called Operation Anthracite Refuse, Special Research Report SR-94 available from the Coal Research Section, College of Earth and Mineral Sciences, Penn State Univ., University Park, Pa. 16802.

So in summary, we have both short and long range plans for the use of fill in creating areas for industry, housing, recreation, etc. We have more than enough fill to use; however, this fill is less than completely desirable in some ways and could possibly be made more desirable by combining it with dredged spoil. Perhaps some tests along this line would be in order. The amount of dredged spoil needed, of course, would vary on the magnitude of any back-filling projects undertaken and the proportion required to mix with culm to make the most desirable fill.

For a copy of the existing and future land use and topography maps, I would suggest that you write the Northumberland County Planning Commission, Courthouse Annex, Sunbury, Pa. 17801. As we are not really a planning agency, such maps were not developed strictly for this area, but the information can easily be extracted from the county maps.

If there is any further information which we can supply, please don't hesitate to get in touch.

Sincerely,

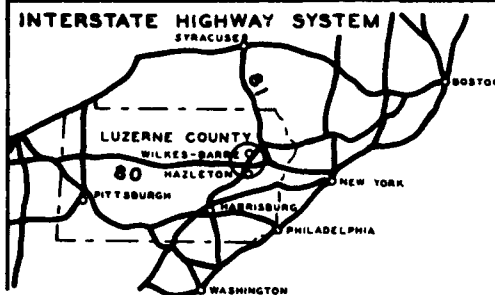
LAREDO

*David C. Keiter*David C. Keiter
Executive Director

/6

LUZERNE COUNTY PLANNING COMMISSION

JOHN A. HOURIGAN, JR.
CHAIRMAN
JOHN L. McDONALD, ESQ.
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EDWARD HEISELBERG
DIRECTOR OF PLANNING

CLARENCE M. LAIDLER
COUNTY ZONING OFFICER

LUZERNE COUNTY COURT HOUSE
WILKES-BARRE, PENNSYLVANIA 18711
TELEPHONE: 825-2749
825-6161 EXT. 226-227

August 24, 1973

RECEIVED
AUG 28 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski,
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

There are many stripping coal pits in Luzerne County which need filling. Also the US Corps of Engineers is raising the dikes two feet in the Wyoming Valley Area of the County, and propose to raise them another five feet by 1980, if financing can be arranged.

The County is concerned with any filling of pits that the material be non-combustible, and that it will do ^{no} damage to any existing or potential water supply. The following is given in answer to your questions:

1. We have generalized plans to develop areas that will require fill.
2. What is meant by economically made available?
3. Leveling stripping areas, and for raising dikes if material is suitable.
4. The amount needed is not known.

Page 2....
Mr. Edwin Drabkowski
Green Associates
August 24, 1973

5. We can supply you at cost with copies of existing land use, USGS quadrangles, and future land use maps.
6. There is a scarcity of sanitary landfill sites in Luzerne County, and costs of construction materials are high.

Let me say that Luzerne County, and surrounding counties, have refused to accept refuse from Philadelphia or other metropolitan areas for fear of a bad image, mine fires, and water pollution.

Yours truly,



Edward Heiselberg, Director of Planning
Luzerne County Planning Commission

KH/msa



LACKAWANNA COUNTY
regional planning commission

(MM)

County Administration Bldg.

September 6, 1973

Mr. Edwin F. Drabkowski
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

RECEIVED

SEP 10 1973 8173

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Dear Mr. Drabkowski:

This letter will briefly outline land fill needs in Lackawanna County as they relate to your Company's Dredged Spoil Study (contract 8173). To acquire greater knowledge of our fill needs, we would welcome a visit and inspection tour of Lackawanna County by you or another representative of your Company.

With regard to questions presented in your recent letter:

- 1) In our future plans we anticipate the need to acquire fill for development purposes. Due to the past mining experience in Lackawanna County a significant portion of the County's land area has been stripped. Where strip mining has occurred large amounts of fill are needed to restore the land to productive use.
- 2) If fill were readily and economically available, we foresee many possibilities for using the material to enhance the economic base of the County.
- 3) We believe the restoration of stripped mined area would offer a unique and productive use of fill material.
- 4) Because we have not yet had the opportunity to engage in a detailed study of fill needs within the County, we cannot at this time give a definite figure of the amount of fill which could be utilized. It would appear from empirical observation a significant quantity of fill could be readily utilized.
- 5) Land use and topographic maps are enclosed.

RR
(EFO)
RAM
ROB
VE

A60
200 Adams Ave. Scranton, Pa. 18503 • 717-346-7421

A60

Mr. Edwin F. Drabkowski
September 6, 1973
Page 2

- 6) A sufficient number of land fill sites exist within the County. The major problem encountered by these sites is meeting the environmental regulations of the State's Department of Environmental Resources (DER). It now appears an adequate number of sites have been approved by DER to meet the County's present need for sites to deposit solid waste.

If you need any additional information or would like to have a tour of the County, please contact our office.

Sincerely,


Joe Naughton
Senior Planner

JN/mt
encl.

cc: Leonard Ziolkowski, Economic
Development Council of NE Pa.

SOUTHEASTERN VIRGINIA PLANNING DISTRICT COMMISSION

HAROLD B. ATKINSON - CHAIRMAN
V. H. NUSSBAUM, JR. - VICE-CHM.
DURWOOD S. CURLING - SECY.-TREAS.

110 W. PLUME STREET, NORFOLK, VA. 23510
TELEPHONE: AREA CODE 703 - 622-8301
ROBERT F. FOELLER - EXECUTIVE DIRECTOR

October 15, 1973

RECEIVED

OCT 23 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Re: Disposal of Dredged Spoils (LUG)

Dear Mr. Drabkowski:

Per your request of August 8, 1973, the staff of the Southeastern Virginia Planning District Commission is happy to provide the following information for your study of the need for fill material in Southeastern Virginia. Although this office is the regional planning agency for a 2000-square mile area of Southeastern Virginia, most studies of dredging and the uses of fill materials in this area have been conducted by the Army Corps of Engineers. The Norfolk District Office of the Corps can probably provide you with more detailed information regarding potential uses of fill material in this region.

At present, most dredged material from the Hampton Roads area is deposited in the Craney Island Disposal Area in Portsmouth. This area, encompassing approximately 2500 acres, has been used since 1957. With a design capacity of 125,000,000 cubic yards of fill, the Craney Island Disposal Area is projected to reach capacity by 1979. In a 1972 study of the Craney Island Disposal Area, the Corps explored several alternative disposal sites. Among the alternatives was the use of some 5000 acres in the City of Nansemond (formerly Nansemond County). This area is located north of U. S. Route 460 in the Great Dismal Swamp. With a projected capacity of approximately 170,000,000 cubic yards of fill, this site would be expected to provide the necessary disposal area for all harbor dredging for about 40-45 years. Depending on the quality of the fill, this land would then be available for both agricultural and urban uses. The SVPDC would recommend that at least some of the area be reserved as a site for a regional recreational area.

This study also explored the use of borrow pits as disposal sites. The study indicated that the region's borrow pits would not adequately meet the need for disposal sites. In addition, many of these pits serve as important open spaces in the region. Expensive homes have been constructed adjacent to several of them, which are now used for boating and fishing. In these areas, serious citizen opposition to fill proposals should be expected.

October 15, 1973

The most pressing need for fill-type material in the region is for beach replenishment in Virginia Beach. The Draft Environmental Impact Statement, Virginia Beach, Virginia, Beach Erosion Control Project, prepared by the Corps of Engineers in May 1973, indicates that a minimum of 250,000 cubic yards of sand is needed annually for beach replenishment. This project requires clean sand, lacking heavy metals, volatile solids and other hazardous pollutants. To facilitate this project, it might be appropriate to procure and develop temporary disposal areas (spoil "banks") in order to stockpile sand for future needs.

There may be other potential uses for dredged spoils for highway embankments, reclamation of scattered areas of low, swampy land, etc. Such uses would be dependent on the type, quantity and quality of available materials and the costs of delivering spoil to the site. It would be hoped that a study such as the one you are undertaking could further define future potential uses of dredged spoil and considerations relative to quantities available, quality of available materials, and costs.

Enclosed are copies of the existing and future land use maps of the Southeastern Virginia District. Because this area is relatively flat (up to 25' above sea level), we have not included a slope analysis map. The U.S.G.S. topographic maps of the region have all been photo-revised and will provide more than adequate slope data in addition to showing areas of recent urbanization, borrow pit locations, and sand deposition along the shoreline.

We hope this information will be helpful to the successful completion of your study. If we can provide further data, do not hesitate to call.

Sincerely,



Robert F. Foeller
Executive Director

JMC:bcm

Enclosures

WV

RAPPAHANNOCK AREA DEVELOPMENT COMMISSION

RADCO PLANNING DISTRICT 16

CAROLINE COUNTY
KING GEORGE COUNTY
SPOTSYLVANIA COUNTY
STAFFORD COUNTY
FREDERICKSBURG CITY

August 10, 1973

CHARLES A. KRAMER
CHAIRMAN

RONALD J. REBMAN
EXECUTIVE DIRECTOR

Mr. Edwin F. Drabkowski, Project Manager
Green Associates, Inc.
Engineers, Architects, Planners
32 West Road
Towson, Maryland, 21204

Dear Mr. Drabkowski:

After considering our recent telephone conversation and reading the study outline, I offer the following answers to your questions for review and consideration:

1. Our Organization is not preparing any short or long range plans outlining the need for fill.
2. & 3. If the material was readily and economically available, the composition and characteristic of the fill would indicate the best use of this material; for example, if the fill could be used to increase the fertility of various soils, then I believe that it would be worthwhile to explore this possibility. On the other hand, if the fill material does not present any benefits other than being a certain number of cubic yards of mass, then I would suggest that it be considered as material in various sand and gravel excavations.
4. The amount of fill material which could possibly be used in our area is contingent on the feasibility of the proposals in the previous answer. There is a considerable amount of sand and gravel deposits in the river terraces which may be removed in the coming year. Furthermore, there is extensive brush land acreage within the region which might be converted to agricultural use.
5. Our maps depicting the type of information you requested such as existing land use, etc. are available at \$3 each. The region is divided into 6 sections, the scale being 1" = 2,000', with one set containing the 1973 existing land use structure by structure, agriculture, forestry, and brush land areas; the topographical maps are at the same scale with 50' contour intervals and the future land use map being at 1" = 1 mile.

RECEIVED

AUG 13 1973

GREEN ASSOCIATES, INC.

RAM
MRP
EFJ

913 CHARLES STREET

POST OFFICE BOX 863

FREDERICKSBURG VIRGINIA 22401

AREA CODE 703/373-2890

A64

Page 2

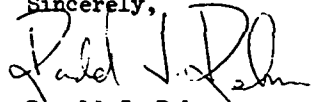
Mr. Edwin F. Drabkowski

August 10, 1973

After reviewing the study outline, it appears to me that the uses of the dredge material should be based on the physical properties of the material. I would like to see analysis of the material similar to that conducted by the Soil Conservation Service - for example, what would be the permeability, the stability of the material relative to the slope phase, the organic content, the acidity, the fertility and if any of these characteristics would change significantly by varying the depth.

I would appreciate receiving a copy of your final report or a list of recommendations which you will establish at the conclusion of this study. If I can be of any further assistance, please feel free to contact this office.

Sincerely,

A handwritten signature in dark ink, appearing to read "Ronald J. Rebman".

Ronald J. Rebman
Executive Director

RJR/s



ULSTER COUNTY PLANNING BOARD

COUNTY OFFICE BUILDING -> U. P. O. BOX 483

KINGSTON, NEW YORK 12401

TELEPHONE AREA CODE 814 331-9300

RECEIVED

OCT 17 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

October 15, 1973

Mr. Edwin F. Drabkowski
Project Manager
Green Associates
32 West Road
Towson, Md., 21204

re: Dredged Spoil Study

Dear Mr. Drabkowski:

A copy of your letter of September 17 to Mr. Henry Williams of the New York State Office of Planning Services was sent to me.

We have a county park with 3000 feet of frontage on the Hudson River just north of the Kingston-Rhinecliff Bridge. The park was just purchased with U.S. Bureau of Outdoor Recreation assistance and is open to the general public - not just local residents. A beach was created approximately 30 years ago when the Hudson River Channel was deepened. This beach has been eroding badly in the last few years.

We approached the Corps of Engineers for a restoration project, but they indicated we are probably beyond the normal scope of a shorefront project. They suggested that we should probably simply replenish the lost sand.

If you have any sources, we would be most interested for our park.

Sincerely,

Herbert Hekler, Director
Ulster County Planning Board

HH/dms



CONNECTICUT



NEW JERSEY



NEW YORK

TRI-STATE REGIONAL PLANNING COMMISSION

100 CHURCH STREET, NEW YORK, N. Y. 10007

TELEPHONE (212) 433-4200

October 4, 1973

RECEIVED

OCT 9 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

As one of the agencies involved in coastal zone management studies, we have received from Mr. Henry Williams, New York State Office of Planning Services, a copy of your letter to him dated September 17.

Other agencies with construction responsibilities, such as UDC and Port Authority, will be able to give you substantive answers. However, for whatever they are worth, I will attempt to respond to the questions in your letter.

1. From our coastal zone studies, we would suppose that the main fill areas would be in the harbor and related bays, kills and rivers where environmental impact on wetlands will be minimal or acceptable. An easy example, of course, is the Hackensack Meadowlands area. Another example would be possible containerport developments of the Port Authority or of New York City's Ports and Terminals agency.
2. We believe that fill material provided by dredging could probably be used in the harbor area for shipping and related upland storage and warehousing, perhaps housing, certainly new parkland, and industry only if water oriented. I know of no highway plans needing fill except perhaps the West Side Highway reconstruction in Manhattan. This assumes that the Bayonne Expressway project is already taken care of from this aspect.
3. As you are no doubt aware, potential unique uses of fill material include artificial islands for airports, shipping and oil terminals, and garbage disposal. Also, it is possible that in connection with

the future sanitary land fills in the region that dredged fill can be used as cover material.

4. No information.
5. A report on the need for sanitary land fill is enclosed as possibly being useful in this connection.
6. Obtaining sand, gravel and stone for the construction needs of the inner region is a continuing concern. Our agency limits itself to large-grain forecasts of housing and nonresidential space needed in the future. It is conceivable that such projections could be converted into a need for construction materials, including possibly dredged fill.

I note that the Nassau-Suffolk Regional Planning Board was not listed in Mr. Williams' covering letter as among those receiving your letter. I mention this agency because they have done special studies of the extraction potentials and problems in Long Island and therefore may have relevance to your investigation.

Please let us know if we can help further.

Sincerely yours,

Hall Winslow

HW:hm
encl.
cc: Hank Williams
R. S. DeTurk

Hall Winslow
Coordinator, Coastal Zone Studies

WESTCHESTER COUNTY PLANNING BOARD

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	WILLIAM G. BORGHARD COMMR. OF ENVIRONMENTAL FACILITIES	EX OFFICIO

WESTCHESTER COUNTY DEPARTMENT OF PLANNING

PETER Q. ESCHWEILER, A.I.P.
COMMISSIONER
JOSEPH R. POTENZA, A.I.P.
DEPUTY COMMISSIONER

910 COUNTY OFFICE BUILDING WHITE PLAINS, N. Y. 10601 914 WHITE PLAINS 9-1300

October 1, 1973

RECEIVED

OCT 4 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, MD 21204

Dear Mr. Drabkowski:

Your recent letter to Mr. Henry Williams, Deputy Director of the New York State Office of Planning Services, regarding your Dredged Spoil Study (Contract 81703) has been circulated to the County Planning Directors in New York State. I thought that these immediate reactions on our part might be helpful to you in the course of your work, and indicate areas at which you could give further investigation.

Westchester County is the first suburban county north of New York City, with extensive shorelines on the Hudson River and on Long Island Sound. Geologically, the two shorelines are quite different. The Hudson River shoreline is a rift valley, with rock walls ending abruptly at the river's edge. The Long Island Sound area is a coastal plane, estuarine, with a more irregular shoreline, low lying promontories and the like. There are a few natural bays and harbors along the Hudson shorelines, whereas the Sound coastline has many such areas and accordingly has a considerable reputation for boating. Harbor dredging on the Sound is therefore a recurring and necessary activity. Dredging in the Hudson is limited to the main channels and to one or two ship channels into the commercial harbor areas in Yonkers, Hastings, and Peekskill.

In addition to the abrupt topography of the Hudson River valley, that area of our county also has the unique condition that the Hudson division of the Penn Central Railroad runs the full length of the County at the water's edge. Only in a few places is there land accessible to the public on the river side of the railroad. This means that although the Hudson is a natural and attractive recreational resource for our

Mr. Edwin F. Drabkowski
Project Manager

-2-

October 1, 1973

citizens, it is difficult for them to find locations at which they can cross the railroad tracks and reach the river's edge. Fortunately, it has been the County's policy to establish wherever possible County-owned park and recreation areas on the river side and the railroad tracks. We have considerable acreage in the County parks at Kingsland Point, Croton Point, Oscawanna, and George's Island.

Thirteen of our municipalities have frontage on the Hudson River. In many of these localities it is official municipal policy to attempt to establish recreational areas on the river's edge wherever possible. Because of the presence of the railroad, however, such access is difficult to obtain. I think many of communities would be interested in developing fill projects which would establish recreational uses along the river's edge. The basic question, however, is the stability of the fill material. Can the sediments that dredged by the Corps of Engineers be used directly in such projects? Is Federal aid available to give financial assistance to our municipalities in establishing the necessary bulkheads or cofferdams within which to contain the fill? My comment, therefore, is that many of our municipalities could use fill to establish such public recreation areas, but very few could afford to undertake the large scale engineering projects that would probably be necessary to enable them to do so. You may wish to recommend, therefore, that the Corps investigate some multiple purpose program that will permit them to utilize this potential market for their product. Such a program could be tied into other Federal grants in aid, perhaps.

Another place where Westchester County has has an increasing demand for fill material has been as cover at our County Sanitary Landfill at Croton Point. The County is currently disposing of approximately 1500 tons per day of solid waste at our sanitary landfill. We are under Federal court order to see that adequate fill material is used to cover the solid waste. The unusually high requirements for such fill has raised the cost of solid waste disposal at Croton Point by a factor of three in the last 12 months. A ready source of suitable fill material would therefore be very much in the public interest. Unfortunately, the question of the character of the fill is again of prime importance. Your investigations, therefore, could profitably include analyses of the typical physical characteristics of the dredged material to determine if they meet the accepted standards for cover material at sanitary landfills. Such standards are set or are being developed by the Federal Environmental Protection Administration, and should also be coordinated with those recommended by the Soil Conservation Service of the United States Department of Agriculture.

Mr. Edwin F. Drabkowski
Project Manager

-3-

October 1, 1973

I hope these general comments will be helpful in your stay.
If we can be of further assistance, please do not hesitate to call
upon us.

Very truly yours,



Peter Q. Eschweiler
Commissioner

FQE:pat

CC: Mr. Howard Quinn
Mr. Henry Williams

SEA GRANT

state university of new york · cornell university

NEW YORK

nys sea grant program office, suny, 99 washington ave., albany, n.y. 12210 518/474-5167



September 27, 1973

RECEIVED

OCT 9 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski,

Your inquiry to the New York State Office of Planning Services has been referred to the Sea Grant Program among other agencies. You have requested information on needs for, or potential utilizations of dredge spoils developed by the operations of the U. S. Army Corps of Engineers. The New York State Sea Grant Program is not an operational agency and we are therefore unable to respond except in an advisory capacity.

There are several items which should be called to your attention. First, sand dredged from harbor and channel areas in coastal areas of New York State should be considered for disposal in appropriate areas to replenish the natural transport systems. That is, for example, sands dredged from inlets or harbor systems on the south shore of Long Island should be considered for beach replenishment at the eastern end of Long Island. Removal of these sands from the system serves only to continue the already serious erosion cycle we are experiencing. We are currently supporting research under the direction of Dr. Donald Coates, Department of Geology, State University of New York at Binghamton, on the potential of giant bypassing of sands from western Long Island regions to the eastern points which are the sources.

A second potential utilization of the dredge spoils would be to create artificial islands in appropriate areas for the redevelopment of wetlands lost through landward construction. Under the direction of Dr. Orville Terry, Marine Sciences Research Center, Stony Brook, Sea Grant has conducted some experimental replantings of Spartina on such artificial islands and found it to be feasible.

Thirdly, as sources of sand and gravel become increasingly scarce from terrestrial sources, the potential of offshore mining increases. Since extensive mining of offshore deposits for either construction or beach replenishment purposes

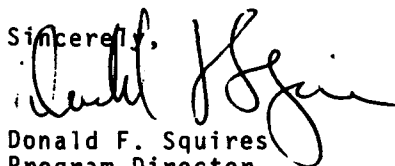
is almost surely to come in conflict with shellfish management programs, it will be important to ascertain the potential of dredged materials for either of these purposes.

Finally, many of the coastal waters of New York have been, for many decades, utilized as primary treatment areas for sewage disposal systems. Careful attention needs to be given to the quality of the substrates being dredged prior to the time that any of the suggested utilizations can be undertaken.

Many of the above comments relate equally to problems along the Great Lakes coastline of New York State. Erosional problems have increased in recent years, terrestrial sources of sand and gravel are becoming more difficult to develop and there is an increasing demand for the creation of new recreational beaches and the attendant nourishment programs they will require.

With respect to the suggestions I've outlined above, we have not reached a point at which quantitative estimates can be provided. I would suggest that you contact the researchers mentioned directly for their possible contributions to your request for information.

Sincerely,



Donald F. Squires
Program Director

DFS:po

cc: Dr. Donald Coates
Dr. Orville Terry
Mr. Henry Williams

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STATE OF NEW YORK

PUBLIC SERVICE COMMISSION
44 HOLLAND AVE., ALBANY, N. Y. 12208

GENERAL COUNSEL
PETER H. SCHIFF

SECRETARY
SAMUEL R. MADISON

IN REPLY REFER TO

October 9, 1973

RECEIVED

OCT 12 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

Mr. Henry Williams, Deputy Director, New York State Office of Planning Services, routed to this agency a copy of your September 17 letter concerning the disposal of dredged spoils.

The only direct statutory concern that this agency has for the disposal of spoils is in connection with Article VIII of the Public Service Law -- power plant siting. Under the law and the regulations promulgated to implement the law, a utility which seeks permission to build a power plant must, among other things, describe how it proposes to dispose of any dredged spoils taken during site preparation.

As for the questions raised in your letter, the New York State Public Service Commission is not a site or area development agency. The Commission is concerned with the conduct of public utilities engaged in individual and collective decision making, much of which has a developmental cast. Accordingly, we are in no position to answer in an authoritative fashion the questions you ask.

As for question 1, however, to the best of my knowledge, no company has made public plans to use dredged spoil in connection with a site under consideration. Given the problems associated with finding suitable power plant sites, I would think that the utilities of this State would be responsive to using the spoil material as fill if it broadened the siting options available.

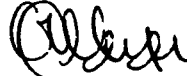
Mr. Edwin F. Drabkowski

- 2 -

October 9, 1973

I hope this will assist you in understanding the role of the Public Service Commission in connection with this issue. If you would be interested in communicating with individual companies concerning the need for, or use of, dredged spoil, please contact me.

Sincerely,



Alfred F. Meyer
Chief, Generating Facilities
Planning & Certification

cc: H. Williams



TRI-COUNTY COUNCIL for SOUTHERN MARYLAND

P.O. BOX 301 WALDORF, MARYLAND 20601 301 645-2693

JOHN T. PARRAN JR., CHAIRMAN
JOHN H. MILLS, PH.D., EXECUTIVE DIRECTOR

RECEIVED

October 31, 1973

NOV 2 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Lee Moser
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Re: Dredged Spoil Study
Your contract 8173

Dear Mr. Moser:

I think that during the past discussions with representatives of your office, we may well have explored the possible uses for dredged spoil material which you are addressing in this particular contract. Effectively I do not think that I can offer much encouragement insofar as a long-range fill program is concerned, particularly in the public sector.

I have conferred with County Planners and find that there would be limited inland uses for it. In fact, more recent discussions relative to water resources might even indicate that fill areas would be more appropriately considered as water impoundment sites.

There is always the possibility of bulkheading and back fill in that regard. You are, of course, aware that this would be mostly limited to repair and maintenance work for existing wetlands legislation constrains much of this activity, and I would, therefore, not expect a whole lot in that regard.

Perhaps your inquiries also address the private sector. Time and circumstances may well change the posture for fill activity; but even should the climate or need change, the characteristics of the spoil would need to be known. For ecologically we are currently confronted with problems of materials which might have deleterious side effects. You, of course, discussed this matter with Dr. Tiller and certain assumptions were then made as to the stability

CALVERT COUNTY

Sen. J. F. Hoff
Del. T. A. Symon
Comm. C. B. Fowler
Comm. H. G. Truitt
Comm. G. J. Williams, Jr.
F. B. Fletcher
J. Benfey
D. C. Bennett

CHARLES COUNTY

Sen. P. J. Bailey
Del. C. J. Compton
Del. J. H. H. H. H. H.
Comm. J. C. Simpson
Comm. E. J. Sprague
W. J. Argo
O. J. Robertson, Jr.
J. J. Patten, Jr.

ST. MARY'S COUNTY

Sen. P. J. Bailey
Del. J. H. H. H. H.
Del. J. H. H. H. H.
Comm. G. B. Aust
Comm. J. W. B. B.
Comm. J. S. Gray, Jr.
V. W. W. W.
J. H. H. H. H.
J. J. Bailey, Jr.

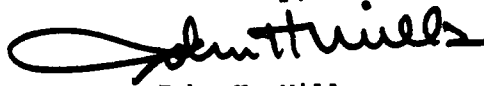
Mr. Lee Moser
Oct. 31, 1973

-2-

of the material, a lack of garbage or rubbish, the possible need for desalination or other processing. In any case, it would appear that those assumptions need to be further pursued along the lines of stabilizing the material to function more effectively in bulkheading or bulkhead fill where it presently exists and needs to be reinforced or re-established in such a manner as to preserve the shoreline without deleterious effect on the environment.

My apologies for the delay, but I trust this may serve some of your needs. I would hope to discuss some other alternatives which unfortunately do not arise to the surface.

Sincerely,

A handwritten signature in cursive script, appearing to read "John H. Mills". The signature is written in dark ink and is positioned above the printed name and title.

John H. Mills
Executive Director

JHM:swb

RECEIVED

NOV 16 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

November 9, 1973

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

OhioEPA

John J. Gilligan
Governor
Dr. Ira L. Whitman
Director

RE: Dredged Spoil Study

Dear Mr. Drabkowski:

With regards to your letter of September 17, 1973, I hope the following information will be helpful.

Regarding development areas that will require the need for fill (question number 1 and 2) we have no plans to develop or propose such areas. Creation of areas for economic development such as industry, recreation, etc., is a local option over which the State has no jurisdiction. Zoning is controlled locally and there is presently no land use legislation or policy at the State level.

Unique uses for fill material (question 3) in Ohio may be a consideration of the strip-mined areas of Southeastern Ohio. Ohio's strip mine legislation provides for reclamation of strip-mined lands and dredge spoil could possibly be used as a soil conditioner. Such use would be contingent upon an analysis of the dredge spoil proving it to be non toxic. A spoil analysis should include: trace metals, sulphur compounds, nitrates, phosphates, etc. In addition, the economic costs of transporting the fill to those areas would be an important factor. Local coal companies and county commissioners may be of further assistance as they are presently working with the Cleveland Regional Sewer District for the purpose of hauling municipal sludge to strip mined areas for land reclamation. In this era of environmental concern, dredge spoil might be an added alternative method for land reclamation. Specifically, Guernsey County in conjunction with the Cleveland Regional Sewer District, the OEPA and the Ohio Department of Natural Resources has initiated a land reclamation program and you may wish to pursue this further at a purely conceptual level with the local officials.

Landfill sites are scarce except in the strip mined areas of Ohio. This can be explained by stricter regulations enacted by OEPA and local health officials and lack of available space in the Metropolitan areas covering much of the State.

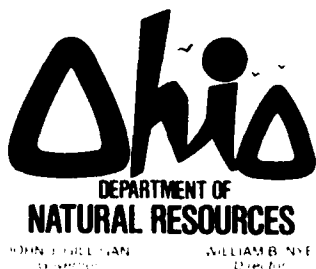
Page 2
November 9, 1973
Mr. Edwin F. Drabkowski

If I can be of further assistance, please feel free to contact this office.

Sincerely,


Norma J. Weisner
Assistant Division Chief

NJW/ckf



Division of Planning

FOURTH FLOOR, 1000 MARKET STREET, BALTIMORE, MD. 21202

October 30, 1973

RECEIVED

NOV 5 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

This is in reply to your letter of September 17, 1973. In attempting to pull together the information requested, I find that within the Ohio state government, very little thought has been given to potential or innovative uses of the dredged spoil material. This situation is the result of two factors. First, the responsibility for disposing of dredged spoil material in Ohio rests primarily with the local jurisdictions that operate and maintain commercial harbors. Since this matter has historically been one of local concern, it has, until recently, received little attention at the state level. (The state's involvement in this problem has increased recently with the initiation of an Ohio Department of Natural Resources program designed to assist local jurisdictions in finding sites for the disposal of dredged spoil material.) A second factor that has hindered the development of innovative uses of dredged spoil is the fact that it has always been perceived as a problem, and not a resource. As a result of this attitude, schemes for disposing of spoil material have been limited to conventional concepts such as diked disposal areas, landfills in the near-shore area, and open lake dumping.

The information provided herein was not drawn from existing studies or reports. This information represents the current thinking of several people employed by the Ohio Department of Natural Resources. Following are our answers to the questions posed:

1. We are unable to identify any specific plans for developments that will entail the use of fill material. However, there are a number of possibilities that could be explored:
 - a. Reclamation of strip mined lands - there are 176,457 acres of coal stripped land in Ohio that require reclamation. Ohio is actively pursuing a strip mined reclamation program that could conceivably employ dredged spoil material for fill purposes.

1. (con't.)

- b. Sealing of drift mines and deep mines - It is possible that dredged spoil material could be used in drift mines and deep mines to prevent acid drainage and subsidence problems.
 - c. Landfills - Nearly all counties, municipalities, townships, and villages in Ohio operate a public dump. Generally, there is insufficient fill material to cover, compact, and recontour the land above these landfills. If there were a suitable source of additional fill material available, these landfills could be completed in a more timely fashion, and returned to productive use.
 - d. Recreation - If there were a suitable source of fill material available, it is possible that it could be employed to construct ski slopes, toboggan runs, or golf courses in several areas of Ohio.
 - e. Agriculture - Ohio is a highly agricultural state and could undoubtedly put spoil material to productive use if it could be processed as a form of fertilizer or top-soil.
2. Ohio could use fill material for economic development if it were made economically and readily available. However, there would be some restrictions upon the geographic areas in which this fill could be so employed. Two areas in which the State would not condone fill projects are wetlands and flood plains. I have enclosed materials that describe the limitations that would be placed on projects in these areas. (Enclosures: Department of Natural Resources Wetlands Policy Statement, the Governors Executive Order with regard to flood plains, and the Department of Natural Resources Criteria For The Regulation of Flood Plains.)
3. The reclamation of strip mined lands would be the most unique use that Ohio would make of dredged spoil material.

October 30, 1973

4. We cannot quantify the amount of fill that would be required in Ohio. (It would be substantial if it were feasible to process it for agricultural use or for the reclamation of strip mined lands.)
5. I am not aware of any publications in Ohio regarding the use of or the need for fill material.
6. As mentioned previously, there is a need for additional fill material in local landfill projects. As a result of a shortage of fill material, local landfills often take years to complete. These landfills could be returned to productive use in a more timely fashion if additional fill material was available.

I hope this information will be of assistance to you in your current project. If you have any further questions, feel free to contact me.

Sincerely,



Gary V. Turner, Administrator
Shoreland Management Unit
Division of Planning

Enclosures
GVT/r



Ohio Department of Transportation

25 South Front Street
John J. Gilligan, Governor

Columbus, Ohio 43215
J. Phillip Richley, Director

October 2, 1973

RECEIVED

OCT 9 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Green Associates Inc.
32 West Road
Towson, Maryland 21204

Attention: Mr. Edwin F. Drabkowski

Re: Dredged Spoil Study

Dear Mr. Drabkowski:

In response to your letter of September 17, 1973, which posed certain questions relative to the potential use of dredged spoils as fill materials, the following comments and question responses are offered:

First of all, it should be mentioned that our response to your inquiry is applicable only to the potential use of dredged materials as may be related to transportation. We would not attempt to speculate on the possible utilization of these materials by industry, housing, agriculture, or recreation interests. It does seem logical, however, to assume that these materials would be potentially useful for other than highway construction if they were accessible and economical. Perhaps the Ohio Department of Economic and Community Development could furnish you some information which would be applicable to the areas mentioned above.

With respect to question number one, our answer must necessarily be general to the point of stating that long-range planning for transportation improvements does anticipate the need for fill materials in areas where existing materials resources are limited and perhaps in areas where dredge materials may be available. A more specific answer could be obtained by conducting a review of proposed improvements by geographical area to determine whether dredged fill materials could be utilized. For your information, in calendar year 1972, the Ohio Department of Transportation used approximately 20,000,000 cubic yards of embankment material at an average cubic yard cost of \$0.55.

Question number two can be answered in the affirmative with the qualifications that the dredged fill materials are suitable, accessible and economical. Suitability would refer to the physical characteristics of the material; that is, density, Atterberg Limits, gradation, presence of organic matter, etc. We have attached excerpts from our 1973 Construction and Materials Specifications which govern the materials which may be used for embankment construction. Accessibility would relate to the point of origin of the materials, ease of handling and mode of transport, all in terms of proximity to a specific project. Economic considerations must take in account such items as costs of processing the material, transporting it to a job site and, if necessary, adding materials for its beneficiation. This total cost, on a job-to-job basis, must then be compared with the cost of alternative materials, to determine whether a cost savings could be expected.

The Future Belongs To Those Who Prepare For It

In answer to question number three, one possible unique use for dredged materials would be in the construction of large metropolitan airport facilities such as the proposed Lake Erie Airport facility at Cleveland, Ohio. However, for the foreseeable future, highway construction will continue to be the single largest user of fill materials in the transportation field.

Question number four asks for an estimate of the amount of dredged fill material which would be needed for future improvements. We have no way to make a realistic estimate of need because of the uncertainties with regard to potential sources of materials to be utilized on specific projects, particularly those in urban areas. In Ohio, the contractor is responsible for seeking out sources of fill material when none is available through excavation on the project. The Department does provide some assistance to the contractor when negotiations for borrow materials involves local governmental jurisdictions. If suitable dredged fill materials were locally available to a given project, the Department could convey that information to the contractor and provide assistance in making necessary arrangements to secure it.

In response to question number five we have no published reports relative to the use of or need for fill material. However, attached is an excerpt from the July-August 1963 issue of the OHIO CONTRACTOR magazine which describes in some detail a construction project in which hydraulic fill was used. This project involved the relocation of U.S. 52 in Clermont County, east of Cincinnati, Ohio, with approximately 3½ miles of the 5 mile project consisting of hydraulic embankment construction. The hydraulic embankment construction was entirely satisfactory and resulted in significant cost savings to the State of Ohio.

Your last question asks whether special problems are locally encountered because of a lack of landfills or construction materials. Lack of fill material is a particularly acute problem where major highway construction occurs in most urban and some suburban areas. Design of a depressed section does help alleviate this problem; however, with the major grade separations which are normally required the demand for suitable embankment often exceeds the supply available. It would be advantageous to the State of Ohio, to local governments and commercial interests to have potential sources of dredged fill materials available in the Cincinnati, Cleveland and Toledo areas, to mention but a few.

We recognize that your study for the Corps of Engineers could be of considerable ultimate benefit to the Ohio Department of Transportation and are pleased to have been asked to supply this general information. If we can be of more specific assistance by furnishing estimates for projected construction in certain areas or by discussing in detail the problems relating to availability of fill materials which are now common, please let us know.

Very truly yours,

Leon O. Talbert

Leon O. Talbert, Engineer
Research and Development

LOT:ph
Enclosures

STARK COUNTY REGIONAL PLANNING COMMISSION

624 COUNTY OFFICE BUILDING CANTON, OHIO 44702 454-5651

October 8, 1973

President: Richard R. Hinterleiter
Director: J. Dale Cawthorne

RECEIVED

OCT 11 1973

**GREEN ASSOCIATES, INC.
BALTIMORE, MD.**

Mr. Edwin F. Drabkowski, Project Manager
Green Associates, Incorporated
Engineers, Architects, Planners
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

In answer to your recent letter and follow-up telephone call concerning your study of dredged spoil, I have the following comments:

Stark County has approximately 15 thousand acres of strip mine land. (See enclosed existing land use map.) A potential use of the dredged spoil from Lake Erie could be to fill the strip mine areas. This, of course, would depend on the composition of the dredged spoil and the attitude of local citizens towards such a project. Future land uses would be determined by the amount of water in the fill and the load bearing capacity of the materials.

You should be aware that recently there have been discussions concerning dumping sewage sludge in the strip mine areas adjacent to Stark County. This proposal has met with serious opposition and has become an emotional issue as well.

I would like the opportunity to explore the matter further with your company when we know more about distribution costs, compositions of the spoil, i.e., toxic odors, load bearing capacity, and etc.

Please keep us informed as information might become available to either you or the United States Army Corps of Engineers.

Sincerely,

J. Dale Cawthorne
J. Dale Cawthorne,
Director

JDC:jm
Encl.

WILLIAM P. FERGUS, P.E.
DIRECTOR

October 9, 1973

RECEIVED

OCT 12 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

This letter is in response to your August 16, 1973, correspondence to William P. Fergus with regard to the Dredged Spoil Study that your firm is preparing for the U.S. Army Corps of Engineers.

This Agency has a very limited knowledge about the disposal of dredged spoils or the use of dredged materials as a resource. We hope that you will be able to provide us with more information so that we can determine the applicability and impact of such a study on our region.

To date, no long or short range plans have been developed on areas that require a need for fill. However, in 1968 the Mahoning County Planning Commission undertook a study of "Derelict Lands", since approximately 7,000 acres of land in the County have been disturbed by surface mining. Please write Mr. William Lewis of the MCPC at 21 West Boardman Street, Youngstown, Ohio for a copy of the above. Perhaps many surface mines in our region could be partially reclaimed with dredged materials.

To provide you with the physiographic and land use information that you requested, we are pleased to make the following reports available:

"Physiographic Features"
"Existing Land Use"
"Future Land Use Plan-1990"

In conclusion, I am sure this area would make use of the fill materials in several future planning and development endeavors. We must enlist your aid, however, to determine potential uses.

Sincerely,

William D. DeCicco

William D. DeCicco
Chief Planner

WDD/cd

Enclosures (3)



EASTGATE DEVELOPMENT AND TRANSPORTATION AGENCY

1616 COVINGTON STREET, YOUNGSTOWN, OHIO 44510

☎ 216 / 746-6685 YOUNGSTOWN
389-1404 WARREN



TOLEDO METROPOLITAN AREA COUNCIL OF GOVERNMENTS

420 Madison Ave. / Suite 725 / Toledo, Ohio 43604 / Phone (419) 241-9155

RECEIVED
OCT 15 1973
GREEN ASSOCIATES, INC.
BALTIMORE, MD.

October 12, 1973

Mr. Lee Moser
Green Associates
32 West Road
Towson, Maryland 21204

RE: Dredged Spoil Study Contract 8173

Dear Mr. Moser:

In reference to your letter of August 16, 1973, this office has not developed at this point in time any plans which would pertain to filling in any areas in our region. Our projected Land Use Study Plan is now out of print and we are unable to furnish you with a copy.

However, we do have a number of suggestions which your office could explore:

- 1) Oregon, Ohio has very low, flat topography and is averaging a loss of fifteen feet of shoreland per year. Contact William Gross, Service Director, 5330 Seaman Road, Oregon, Ohio telephone 419/693-9371. Incorporating the new methodology which is being demonstrated near the port of Monroe, Michigan, may be of mutual interest.
- 2) Wolfe Creek Sportsman's Club has suggested to the Corps that the lost lands between Norden Road to Little Cedar Point be reclaimed. Approximately 1200 acres have been eroded. Contact Mr. Gross for detailed information re site.
- 3) The enclosed alternative plan for the north Maumee Bay by the Lake Erie Wildfowlers may have merit. Contact the Bureau of Outdoor Recreation, 3853 Research Park Drive, Ann Arbor, Michigan 48104. The BOR has reviewed the proposed sites. It has potential in that these islands could possibly provide protection to the Toledo Harbor from the severe northeasterly storms.

October 12, 1973
Page 2

Quarries in our area, which are many miles inland, have large quantities of seepage water, in many instances over a million gallons per day. We would suggest that you contact the Ohio EPA relative to their use.

Another contact would be the Toledo-Lucas County Plan Commission, Huron Building, Toledo, Ohio, William Herr, Director, telephone 419/255-1500.

We trust that the above may provide a basis to commence your investigation.

Sincerely,


June Brown
Environmental Associate

JB/jr
Enclosure 1

ERIE REGIONAL PLANNING COMMISSION

~~XXXXXXXXXXXXXXXXXXXX~~ SANDUSKY, OHIO 44870
2121 Cleveland Road (419) 625-9062

August 29, 1973

RECEIVED

SEP 4 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

RE: Dredged Spoil Study
Contract 8173

Dear Mr. Drabkowski:

In reply to your correspondence of August 17th and questions which you have raised, I wish to inform you of the following answers:

- 1) No.
- 2) We have not considered this matter and it does not appear to be practical.
- 3) The only unique use as we can see it would be that this material be used to fill several abandoned quarries and create additional land for recreational use.
- 4) I must admit, we do not have any idea if we can use such material.
- 6) We have not encountered any operation problem in this area in regard to lack of landfills or construction materials. The problem which we have seen are those areas being filled at the present time which are unique in terms of scenic and recreation. I refer to the large marsh which has been filled by an individual causing quite a disappointment to the general public. The people in this area do not wish to see marsh land and natural resources spoiled by any type of filling.

I am enclosing a copy of the Erie County Comprehensive Development Plan for your information and I hope that this study will be useful in your project. I regret that I have to charge you for this particular study since we are in a financial dilemma. We ask that you send \$8.78 to cover the cost of the study plus mailing.

If we can be of any further service to you, please do not hesitate to call me.

Sincerely,

H. Mahnami, Director

A89

RR/2
EFD/2
Rm
Ry
SE
RAC

NATURAL RESOURCES COMMISSION

E. M. LAITALA
Chairman

CARL T. JOHNSON

HILARY F. SNELL

HARRY H. WHITELEY

CHARLES G. YOUNGLOVE

STATE OF MICHIGAN



WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, LANSING, MICHIGAN 48926

A. GENE GAZLAY, Director

December 11, 1973

RECEIVED

DEC 17 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, MD 21204

RE: Dredged Spoil Study
Our Contract 8173

Dear Mr. Drabkowski:

Your letter of September 17 addressed to Mr. George Taack has been referred to the writer for response. Mr. Taack has retired from the Department as of November 30 and, therefore, the writer is now in charge of the Submerged Lands Management Section. We are quite familiar with the Corps of Engineers dredged spoil projects in the State of Michigan. This office is presently involved with the Department's Site Review Committee which reviews all proposed Corps' dredged spoil activities within the State and coordinates State interests with the Corps. We, therefore, have had considerable experience in working with the Corps and are familiar with the various problems concerning this type of activity.

We, too, are extremely concerned over future dredging activities in Michigan and firmly believe that there has to be a new approach beyond the present practices carried on by the Corps of Engineers. We will, therefore, attempt to answer the questions raised in your letter.

1. As an involved agency, do you have any plans to develop or propose for development areas that will require the need for fill?

There are no plans, at this time, that would identify areas that require fill. Obviously, as each Corps' project comes to our attention, we attempt to identify certain sites in proximity to the dredging area for spoiling. In many cases, we have tried to obtain upland sites that do not involve marshes, swamps, or other water areas where certain wildlife or fish values are of interest.



2. If fill material was readily and economically made available, could you use such material in creating areas for economic development such as industry, agriculture, housing, recreation, highway construction, etc?

We believe that if fill material was readily available to other public or private entities, use of this material could be made available for industry, agriculture, public projects, etc. One of the big difficulties is to economically dewater the dredged material and place it in a site that would be readily available for such uses. Somehow, we believe this is the direction that should be taken in the future--that most, if not all, dredged spoils be recycled in the public interest.

3. In your area, what unique use could be made of fill material?

We believe that such fill, if available, could be used to fill in many depressions within municipal areas, to improve soils in rural areas or used in the manufacturing of building blocks or as highway building material.

4. Where fill material can be used in future developments, how much would be needed?

There is no figure, at this time, as to the amount needed, other than it would appear that most, if not all, of the spoils could be utilized to good advantage. We know of several worked-out gravel pits in residential areas that could receive this type of material to improve the landscape and provide for more building sites.

5. Can you supply us with a copy of any published report relative to the use of or need for fill material that you may have?

We have no published reports relative to this type of use or need at this time.

6. Are special problems locally encountered because of a lack of landfills or construction materials?

In southeastern Michigan many gravel pits have been depleted so that the haul distance becomes greater with each year. Obviously, use of suitable spoil material could relieve this problem. Also, there is need for suitable material to cover various types of sanitary land fill sites in metropolitan areas.

We trust that some of these answers will assist you in your further evaluations. We would be very happy to meet with you to discuss this matter and the problems involving the use of spoils. We believe in summary that dredged spoils are a valuable natural resource that should be recycled. It would appear that we are now entering the era of recycling all of our waste products.

Mr. Edwin F. Drabkowski

-3-

December 11, 1973

If we can be of further assistance, please advise.

Sincerely,

BUREAU OF WATER MANAGEMENT
Hydrological Survey Division



M. C. Nielsen, Acting Chief

Submerged Lands Management Section

MCN/cw

COMMISSION:
E. V. ERICKSON
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STATE OF MICHIGAN



WILLIAM G. MILLIKEN, GOVERNOR

RECEIVED

OCT 9 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

DEPARTMENT OF STATE HIGHWAYS

STATE HIGHWAYS BUILDING - POST OFFICE DRAWER K - LANSING, MICHIGAN 48904

JOHN P. WOODFORD, STATE HIGHWAY DIRECTOR

October 3, 1973

Green Associates, Inc.
Engineer-Architects-Planners
32 West Road
Towson, Maryland 21204

Dredged Spoil Study
Your Contract - 8173

Dear Mr. Drabkowski:

We are cognizant of the potential fill source from the maintenance dredging work of the Corps of Engineers. We are also aware of the requirements for on-land controlled disposal, the variability in the consistency of the material and in the pollution problems involved with these spoils.

Considering the on-land disposal of these materials in the future, it may be in the realm of economic and environmental feasibility to utilize these materials in certain of our projects.

In answer to your specific questions:

1. As an involved agency, do you have any plans to develop or propose for development areas that will require the need for fill?

In the course of highway construction, fill borrow is a usual requirement.

2. If fill material was readily and economically made available, could you use such material in creating areas for economic development such as industry, agriculture, housing, recreation, highway construction, etc.?

Yes, with due consideration to economics, material stability and potential political and environmental problems.



October 3, 1973

Page -2-

3. In your area, what unique use could be made of fill material?

The DNR and the Corps are currently considering the use of these materials in a barrier beach shoreline protection system. Other areas of shoreline are also affected with serious erosion problems and non-polluting dredgings might be considered as beach nourishment. Fill for deep shaft mine subsidence problems in some areas, again considering the pollution of ground waters, might be another use.

4. Where fill material can be used in future developments, how much would be needed?

Varies from a few thousand to several million cubic yards at various locations.

5. Can you supply us with a copy of any published report relative to the use of or need for fill material that you may have?

Nothing in published form.

6. Are special problems locally encountered because of a lack of landfills or construction materials?

We are experiencing the usual shortage of high quality aggregates and sands, particularly in our urban and metropolitan areas. We are also encountering zoning restrictions in the development of borrow pits in the southeastern Michigan area.

Additional information may be available from:

A. Gene Gasley, Director
Department of Natural Resources
7th Floor, Stevens T. Mason Building
Lansing, Michigan 48926

Please inform us if we may be of additional assistance.

TESTING AND RESEARCH DIVISION

K. A. Allemeier
K. A. Allemeier, P. E.
Acting Engineer of Testing
and Research



SOUTHEAST MICHIGAN
COUNCIL OF GOVERNMENTS

October 25, 1973

Mr. Lee Moser
Green Associates Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Moser:

This is in response to your telephone inquiry and the August 16th letter written by Mr. Edwin Drabkowski, which both regard regional perspectives to the issue of disposal of dredged materials.

The letter from Mr. Drabkowski specifically requests that the disposal of dredgings be confined only to coastal regions. Appreciating the enormous transportation costs involved in hauling this material to some destination substantially inland from the coast, I would concur that shoreline areas constitute a more economically realistic disposal grounds. However, for the Southeast Michigan Region, I personally feel an aversion toward past proposals which recommended the filling in of marsh and swamp areas. Many would consider these to be unique environmental resources - particularly for a metropolitan area as large as this.

In talking about the problem with several of the staff here, there was some excitement over the prospect of creating aesthetically pleasing regional parks, either adjacent or in close proximity to the shoreline. Such a project would include the advantage of making use of a seldom seen shoreline that exists within the reach of over four and one half million people in this metropolitan area.

Dredgings could be piled upon flat but dry areas. The careful manicure of these man made hills could contribute a character to the park, and provide not only a quiet and naturalistic view of the water, but also lend some scenic variety to the parkland itself. With a noticeable amount of relief, I am sure that the value of such a recreational facility would increase many times. Furthermore, the closeness to the water means that it would be economically feasible to import the dredgings to such a site. Over the next twenty years, it is conceivable that three (3) such parks might be planned for and constructed. Since regional parks are usually of a magnitude where 500 acres is considered a minimum, a very rough estimate on the amount of cubic yards required to develop such a park might be on the order of 30 million cubic yards per park.

JAMES P. GRANNAN Chairman HOWER CASE 1st Vice Chairman CONRAD L. MALISSI 2nd Vice Chairman
JAMES L. TRAINOR Executive Director

BIB FLOOR, BOOK BLDG. 1240 WASHINGTON BLVD. DETROIT, MICHIGAN 48226 Tel. (313) 961-4266

I realize that this figure conflicts with the 4.7 million cubic yards dredged annually that you identify for this area. However, over a period of time (on the order of perhaps six (6) years) enough cubic yards might be available for the development of one such park.

In the construction of transportation facilities, there is always a requirement for fill. However, one must be careful in defining exactly what type of fill material is being considered. If it was the muck excavated from the Rouge and Detroit rivers, little use could be made of it in transportation work. This, I presume, primarily consists of organic material and soft clay which together provide very little loading capacity and is subject to swell. The sandy dredgings from the St. Clair River should offer a greater potential for use. (Hydraulic fill (sand) e.g. was used as base material for the Newark Airport runway.) I discussed this possibility with some people from the Wayne County Road Commission and they seemed to feel that with the proper processing, this material could be used for road construction near the shore. (Processing would be necessary because the sands, as evidenced by their settling out, would be of too fine a grain size to work with.) In areas, however, some distance away from the shoreline, again the high costs of transportation appear to rule out any inland application.

In terms of using this material as fill to expand communities which lie on the waters of the Great Lakes, one such proposal has already been made. The City of Monroe and the Port of Monroe Authority has proposed using the dredgings from the Detroit and Rouge Rivers to construct a sophisticated harbour into Lake Erie as well as to provide for adequate transportation to and from the dock and loading facilities. The intent of this project is to increase the economic base of that community. For more specific information regarding Monroe's plan, I would suggest that you contact Mr. Max McCray, Executive Director, Port of Monroe, 3055 East Front Street, Monroe, Michigan 48161. (I have attached a newspaper clipping which elaborates on this idea.)

I have heard suggestions that dredge materials could be used as cover for land fills. To begin with, there are no land fills located near coastal regions simply for the fact that such a location would run the risk of polluting underground aquifers. Also, if the composition of dredge material is primarily of a sandy nature severe problems arise. Sand is probably the worst type of cover soil that you could lay on top of a land fill since it is easily penetrable by rain water, rodents and insects. The objective of a cover material is of course to prevent any exposure or use of a solid waste. Finally, with respect to this subject, the exorbitant cost of transporting fill to an inland site indicates that the use of dredgings for this purpose is also somewhat difficult to imagine.

Sandy dredgings which are processed might also be considered by glass making private industry. In this area, Great Lakes and Ford, as two examples, require sand for this purpose.

Sands might too be considered as a replacement for salt in the winter. (While I do not understand all the trade-offs between the two, I do know that sand causes some significant problems when applied in this fashion.)

Included in Mr. Drabkowski's letter are six (6) questions. The first question asks whether or not we have any plans to develop areas that would require fill. At this point, the answer is no. In our plans we haven't become specific to the point where we actually recommend that fill be provided for various type of facilities. However, I should point out that regarding many of this area's wetland resources, there seems to be developing a value, which recognizes the intrinsic worth of such areas. This value rests in juxtaposition with a standard "conventional wisdom" which has regarded this kind of resource as an ideal site for dumping.

The next question asks, that if fill material were available, could such material be used in future planning. This is more of a local matter than a regional one at this time.

The third question asks what unique use can be made of the fill material. I think this is probably best answered with the comments I've made regarding the creation of recreational facilities near our water resources.

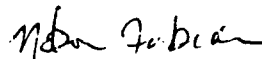
The fourth question asks how much fill would be needed if it could be used in future developments. I have provided an estimate on the quantity necessary for regional parks. The remainder of this quantity question probably could be answered by summing up developers' plans for filling in areas to create residential land.

The fifth question asks whether or not we can supply you with a copy of relevant maps. Enclosed with this letter is a copy of the Open Space Plan and Urban Development map. The final question asks whether or not there are special problems encountered in this area in terms of lack of land fills or construction materials. I know of no such problems.

I hope that the comments from this agency are of some use to you in your project. I have spoken with Dr. Mary Cooper at the District Corps of Engineers' Office and have learned a great deal about the study that is being undertaken on the whole issue of polluted dredgings. I am happy to see that substantial amounts of money and energy are being put into the problem which has many environmental overtones.

If we can be of any further assistance to you please contact us. I am sorry for the delay in replying.

Very truly yours,



Nelson Fabian, Project Coordinator
Office of Environmental Protection
SEMCOG

Monroe seen as great ship center of future

By CHARLES W. THEISEN
News-Monitor Water

MONROE—Within two years, a bulldozer will be seen prowling across a two-acre area, near Mrs. McCray's office, and McCray sees the action as the first step toward Monroe's becoming a great rezoning port.

There may be those who chuckle when McCray talks about Monroe's future as a center of Great Lakes commerce, assuming at least a part of the roles played today by Detroit and Toledo.

But the statistics are as prevalent and convincing as the plan was a few years ago when McCray went around talking about the need to prepare for a coming shortage of gas and oil.

McCray is director of the Port of Monroe.

While LOUISIANA OFFICIALS he talks about a "great port" on the old to dock, of bay and river, the Port of Monroe Center will crowd in with the old and new, and of Great Lakes, St. Lawrence, Saginaw and other ports in trying to become a great port.

McCray's plans for the publicly owned Port of Monroe are not over which to the eye today — a levee, a break on a turning basin on the River, a levee, moved from Lake Erie, affording a 100-foot channel which is 21 feet at its widest.

McCray is not the only one who sees the port as a great port. The Port of Monroe is the Port of Monroe, and the Port of Monroe is the Port of Monroe.

McCray is not the only one who sees the port as a great port. The Port of Monroe is the Port of Monroe, and the Port of Monroe is the Port of Monroe.

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A PROBLEM remains:

Much of the 400 acres is swampy and needs filling.

That's where the bulldozers come in. The U. S. Corps of Engineers has selected Monroe as the site of a test on the use of desolved materials pumped from the bottom of shipping channels to fill lowlands where, through pumping, reclamation can be used for the purpose of raising the water level.

McCray's plan for the Port of Monroe is to use the bottom of a river or lake as a source of material. This can be pumped into a low area easily enough, but it will cost only a relatively low amount of money, and form a crust that prevents drainage of water.

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be disposed of in contained areas. Unpolluted dredgings still may be dumped into deep lake waters.

HE HAS OTHER IDEAS. Too, for the development of Monroe as a regional port.

McCray has just received a commitment of \$150,000 from the State Highway Department, to be provided by local funds, to pay for an economic feasibility study on the future development of Monroe as a port.

The law under which the state grant was made will be revised in 1960 — but McCray is the first Michigan city to take advantage of it, McCray says.

McCray says the study is expected to justify the investment in dredging. Studies to follow will be made by the State and the Port of Monroe.

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"Besides handling other bulk materials, such as grain, we could provide better environmentally sound facilities away from population centers for future power plants, heavy industries, waste treatment facilities and the like."

The second study, a marine terminal, also is a "major piece of work," McCray says. It will be the first of a series of "major pieces of work" that will be done in the next few years.

McCray is not alone in his vision of a new port. He is joined by the many to make what he described as the "great Lakes" of the future, a new port, a new port, a new port.

McCray, he said, would be the ideal place for a heavy industry in the area.

McCray concludes, but he sees a real need for the Great Lakes port, made as a result of the need to control emissions from the port, and a real need for the port, made as a result of the need to control emissions from the port.

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15-B—THE SUNDAY NEWS—Detroit, September 16, 1973

ERIE & NIAGARA COUNTIES

Leo J. Nowak, Jr.
DIRECTOR



REGIONAL PLANNING BOARD

Lon J. McAdam, II
CHAIRMAN
Edward W. Umiker
VICE-CHAIRMAN
Leonard C. Gademsky, Jr.
SECRETARY

August 30, 1973

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SEP 5 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

Pursuant to your letter and request for information directed to Leo Nowak, I am herewith replying in the same order of those questions asked in your correspondence.

1. Yes, however, these areas have not been designated in our short or long range plans as special areas needing fill. There are many communities within our region that are projected for future growth. Much of this area is considered low and in need of fill material when residential or other land use development occurs. Portions of the Towns of Wheatfield, Pendleton, Amherst, Lancaster, West Seneca, Elma, etc. will be requiring fill materials as development occurs. However, the type of fill material used must be stable and suitable for these purposes.
2. Yes
3.
 - Park landscaping, mounding and recreation hills for sledding, tobogganing, etc.
 - Daily cover for sanitary land fill (refuse disposal)
 - Golf course construction
 - Top soil potential for local landscaping and institutional landscaping
 - If regional jetport is constructed in this area a significant need for fill will be required
 - If rich in materials and nutrients and not contaminated, it could be used to enrich lower quality agricultural lands
 - New University of Buffalo Campus in Amherst

Obviously the fill material must be free of odor and other organic material subject to putrefaction. In some cases it would have to be fertile in other cases not required. Again, in some cases structural integrity of the fill will vary.

2085 BASELINE ROAD, GRAND ISLAND, NEW YORK 14072 • TELEPHONE 773-7611 — AREA CODE 716

HELP SAVE OUR ENVIRONMENT USE RECYCLED PAPER

Mr. Edwin Drabkowski

-2-

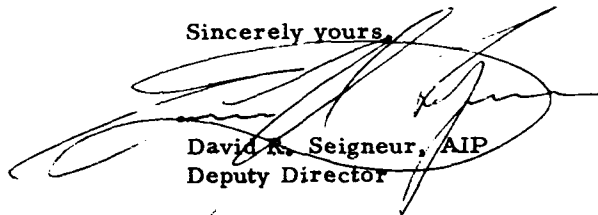
August 30, 1973

4. We have no idea of how much material could be used or would be needed in the future. Again, the answer to that question would depend on the type of fill available.
5. I have attached a copy of our existing land use map. Our future land use (Adopted Land Use Concept) is out of print. If you send a request to me in the next two months, I will be able to send you a reprint of that map. Topo maps are readily available from U.S.G.S. sources.
6. Your question is unclear. If you are referring to a "lack of land fill material", yes there is a general lack of good land fill material for construction purposes, particularly in developing communities like Amherst.

I hope the above material has been of value to you. If you have further questions, please feel free to contact me.

With kindest regards,

Sincerely yours,

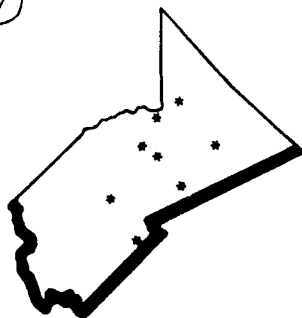


David R. Seigneur, AIP
Deputy Director

DRS:amb
Enclosures

cc: L. Nowak
R. Maltby

(7)



Stanislaus Area
Association of Governments

September 5, 1973

RECEIVED

SEP 24 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

JURISDICTIONS

Stanislaus County Green Associates, Inc.
City of Ceres 32 West Road
City of Modesto Towson, Maryland 21204
City of Newman
City of Oakdale
City of Patterson
City of Riverbank
City of Turlock
City of Waterford

ATTN: Edwin F. Drabkowski

RE: Dredged Spoil Study
Your Contract 8173

In response to your letter dated August 21, 1973 on the Dredged Spoil Study, we have forwarded your questions on to the San Joaquin County Council of Governments in Stockton. We have received the following comments from local sources:

- Question 1: None.
- Question 2: Yes, depending on the type of fill and the degree to which it were "readily and economically made available". Contact Flint Koat Company (1022 Woodland Avenue, Modesto 95351) for more specific information.
- Question 3: Dredger tailings were used in the construction of Don Pedro Dam but must be crushed before being used for most other purposes because of a lack of compactability.
- Question 4: Unknown. Specify type of fill to be made available.
- Question 5: Enclosures.
- Question 6: Usually not. Contact Flint Koat Company for more information.

Steve Locke

Steve Locke
Staff Planner

SL/sc
Attach.

COMMUNICATION - COOPERATION - COORDINATION

720 - 13TH STREET

MODESTO, CALIFORNIA 95354

TELEPHONE (209) 526-6200

A101

4/12/83

EXHIBIT

SCOPE OF WORK OF THE CONSULTANT TO ABAG FOR THE BAY AREA
SOLID WASTE MANAGEMENT IMPLEMENTATION PROJECT

1. Develop the Intergovernmental Structure for a
Solid Waste Pilot Program

Investigate and propose a Joint Exercise of Powers Agreement or other more appropriate arrangements to manage and operate the pilot program, including;

- a. charter membership requirements
- b. cost sharing patterns among members ✓
- c. provision for new members
- d. provision for evolution to a permanent agency
- e. accounting management information system
- f. duties and responsibilities of the entity

2. Design the Management Aspects of a Pilot Program

The Action Committee's consultants will formulate a pilot scale plan to process solid wastes. This task will require evaluation of which wastes should be used, how and where they should be processed, how they should be transported and on which island they should be placed. Subtasks are:

- a. Determine availability and composition of alternative sources of solid waste, Sewage sludge and dredger spoils, and set forth the experimental design to determine optimum mixture.
- b. Evaluate alternative systems for processing wastes, including shredders, separators, and balers.
- c. Evaluate alternative transportation systems, including barge, railroad, short-haul truck transfer, and containerization of waste.
- d. Evaluate alternative sources of solid waste, and sites for processing, transfer and disposition of solid wastes.

- e. Determine optimum combination of systems, including sources and quantities of solid wastes ~~and processing and disposal sites~~
- f. Establish schedule for construction and operation
- g. Initiate negotiations for use permits and clearances.

3. Develop a Cost Allocation Plan

Various parties will be participating in the pilot project and an equitable cost sharing plan among them must be developed.

- a. Acquisition of raw solid wastes - how much to charge contributors for disposing of their wastes.
- b. Transfer processing station - how much to pay for processing of wastes.
- c. Marketing of salvaged materials - how to allocate income from sale of salvaged materials.
- d. Land owner contribution- will land owner pay to have his dikes reinforced, or will he charge for use of his land.
- e. Equitable charges for solid waste management service.

4. Develop a Financing Plan

Having developed an equitable distribution of costs among participants in the pilot project, investigate the following sources of financing and submit any preliminary applications required.

- a. Local - Contributions from local governments, or surcharges on garbage collection bills, to cover cost of pilot project. The contributions necessary for complete local support will be calculated so the project can get underway immediately, even though state and federal funding may be pending.
- b. State - Department of Water Resources, Solid Waste

Management Board

- c. Federal - USDA, EPA, Corps of Engineers
- d. Private Sources - Foundations

5. Public Relations

- a. Provide staff support to the ABAG Action Committee for public opinion meetings and grant and use permit hearings.
- b. Assist with discussions with local land owners and government officials, including presentation of a summary report to the State Solid Waste Management Board.

6. Environmental Evaluation

Make an environmental evaluation to serve as a basis for design of a monitoring system and prepare an environmental impact report for the pilot project. Evaluations will include the following:

- a. Water Quality
- b. Air quality
- c. Levee stability
- d. Agricultural productivity
- e. Public health and safety
- f. Nuisance, including floating debris
- g. Aesthetics
- h. Social and economic impact on the region

7. Negotiations with Local, State and Federal Agencies

In conjunction with the ABAG Committee, conduct negotiations with various local, state, and federal agencies as to their technical participation in, and comments on the pilot program (includes State Solid Waste Management Board).

Their participation will be sought to perform:

- a. Technical studies of levee stability, water intrusion, soil erosion, and other relevant problems.

- b. Monitoring of air and water quality, both before and after project starts.
- c. Soils engineering and fertility studies to determine effect of solid wastes on the native peat soil.

8. Finalize Use Permits and Clearances

Assist the ABAG Action Committee in obtaining final clearances from appropriate agencies to proceed with the pilot project in a manner that conforms with all necessary codes and regulations. Clearances will be obtained from:

- a. Local governments
- b. Regional government
- c. State agencies
- d. Federal agencies

Specifically, this will include obtaining signatures on use permits for processing sites, transfer stations, and disposal sites, as well as operating agreements with participating local agencies.

9. Report Preparation

Prepare progress reports at two month intervals and finally, a summary report containing key features of the intergovernmental structure that has been established and the pilot program. All reports are to be in a style suitable for Action Committee member reports to their respective governing bodies and for public information. The final report will be suitable for use by EPA as a case study of the formation of a regional solid waste management system.

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
TRANSPORTATION LABORATORY
5800 FOLSOM BLVD., SACRAMENTO 95819



RECEIVED

OCT 1 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

September 27, 1973

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, MD 21204

Dear Mr. Drabkowski:

This is in reply to your letter of September 17 concerning the use of dredged materials. I have forwarded copies of your letter to the District Materials Engineers of our five coastal districts since I believe they are better qualified to provide specific answers on past and anticipated future use of dredged materials for highway embankments.

With respect to Question #5, I am enclosing three reports which reflect our current practice on the construction of large embankments using varying quality material. In these special cases the marginal materials are placed in specific zones with, in some cases, special compaction requirements in order to maintain minimum stability.

With respect to Question #6, lack of fill material or, in some instances, an oversupply does create problems which have been magnified by environmental concerns. It is becoming increasingly difficult to obtain the necessary approvals for wasting and the development of borrow pits. For this reason, every effort is made in the design stage to achieve a balanced design so that waste or borrow is minimized.

If I can provide any more specific information, please let me know.

Very truly yours,

JOHN L. BEATON, P.E.
Laboratory Director

RAF:ml

Enclosures

cc: J Sturgeon - Attention Del Hollinger

MO Clemens

DT Cassinelli: John Burris

G Calman

6



C. F. CAMPSELL, DIRECTOR

Ex Office
Commissioner - County Surveyor

COUNTY OF MENDOCINO
DEPARTMENT OF PUBLIC WORKS

UKIAH, CALIFORNIA 95482

(707) 462 1923

September 28, 1973

DIVISIONS

Administration & Business
Roads
Engineering
Land Improvement
Building & Grounds

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OCT 1 1973

GREEN ASSOCIATES, INC.
TOWSON, MD.

Green Associates, Inc.
32 West Road
Towson, Md. 21204

Attn: Mr. Edwin F. Drabkowski
Project Manager

RE: DREDGED SPOIL STUDY
(GREEN NUMBER 8173)

Dear Mr. Drabkowski:

With reference to your letter of 21 August 1973 regarding a
Dredged Spoil Study being prepared by your firm.

While many of your questions relate to Planning rather than the
Public Works functions of this Department-----in-so-far as the
Mendocino County Department of Public Works may be involved,
please be advised as follows:

I would preface my remarks with the statement that-----the
proximity, present land use, and general terrain of Mendocino
County in many ways preclude extensive use of dredge spoils
since there is neither an extensive source or need for what is
normally viewed as spoils. I would additionally suggest (and
will do so by copy of this letter) that the County Planning
Department might have additional and more meaningful input for
your report.

Response by question number of your letter

1. This Department is not the regional planning agency for the
County and I have no knowledge of either short or long range
plans that would require extensive amounts of fill. Perhaps
the one exception would be in the field of waste and refuse

Office Address: Lake Mendocino Drive, The Forks

Mailing Address: Courthouse

A107

Green Associates, Inc.

Page 2

disposal operations but these will in all likelihood entail cut and fill operations rather than the import of fill for cover.

2. This question has little applicability to Mendocino County because of its' general terrain. Our greatest need is for aggregate material suitable for use in construction and there are few sources of acceptable aggregate materials in Mendocino County.
3. Because I normally think of dredged spoils as resulting from channel and/or Bay type clearing operations and because there is limited operations of this type in Mendocino County---- this question is probably not applicable to us. If spoils were made available on a regular basis there could possibly be some use in refuse disposal operations.
4. I would have no way to measure or speculate upon quantities of fill material that might be required. Probably has little application to Mendocino County.
5. This matter is referred to our Planning Department.
6. Mendocino County has a very limited source of acceptable aggregate material for construction, but because of its terrain has ample land fill material.

In summary, I would again point out that Mendocino County has only limited application to your Study and seriously question your statement that "The Corps, as part of its maintenance work annually dredges nearly 7.1 million cubic yards in your area". I know of no such volume of work in the Mendocino County area and must assume that your reference to "area" is to Northern California in general and not specifically Mendocino County.

Yours truly,



C. F. CAMPBELL

Director of Public Works

CFC/vj

cc: Ron Hall, Planning Director
File

①

DEPARTMENT OF TRANSPORTATION

P. O. BOX 3366 RINCON ANNEX
SAN FRANCISCO 94119

RECEIVED

OCT 29 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

October 24, 1973

Mr. Edwin F. Drabkowski,
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 20204

Dear Mr. Drabkowski:

Mr. John L. Beaton of our Transportation Laboratory forwarded a copy of your letter of September 17, 1973 to the District for further comment.

District 04 is composed of the nine Bay Area Counties--Napa, Sonoma, Marin, San Francisco, San Mateo, Alameda, Contra Costa, Santa Clara and Santa Cruz. Large sections of the District, especially adjacent to San Francisco Bay, are highly urbanized. The following are specific answers to your questions:

- 1) Outside of the usual balanced projects now under construction or in the planning stage, we have no immediate plans to construct large embankments that would require large amounts of dredged fill material. Materials dredged from San Francisco Bay vary from high-quality sands to poor-quality bay muds. Development within the confines of San Francisco Bay is controlled by the Bay Conservation and Development Commission (BCDC), and development along the Pacific Coast is controlled by the Coastal Zone Commission. For all practical purposes, environmental considerations have stopped all dredging and filling operations in the bay, sloughs, salt marshes and tidelands.
- 2) We normally do not construct embankments far ahead of our needs. There are exceptions--for example, if a going contract will develop an excess of material, or when an area must be surcharged to minimize future settlement problems. In these or other similar cases, immediate embankment construction for future development would be considered.
- 3) The District confines itself to the planning, construction and maintenance of transportation facilities. At times, poor-quality materials (such as bay muds) are used to

October 24, 1973

flatten embankment slopes or to contour grade interchange areas. Since these bay muds do not readily support growth, in turn they must be covered with growth-supporting soils.

- 4) and 6) To date, we have not experienced serious problems due to shortages of embankment materials. However, the related problems of trucking, noise, dust and traffic congestion resulting from hauling materials through urban areas must be given serious consideration at the planning and design stages of all projects. Economy is no longer the overriding factor in determining the location of borrow sites.
- 5) Mr. Beaton has already forwarded you several reports regarding our current practice.

If we can provide any further information, please let us know.

Very truly yours,

T. R. LAMMERS
District Director

By


B. C. BACHTOLD
Deputy District Director

DEPARTMENT OF TRANSPORTATION

P. O. BOX 1, SAN LUIS OBISPO 93406



(2)

October 11, 1973

RECEIVED

OCT 15 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Edwin F. Drabkowski
Green Associates Inc.
32 West Road
Towson, Md. 21204

Dear Mr. Drabkowski:

Mr. Beaton of the California Transportation Laboratory referred your letter to us for an answer about use of dredged spoils.

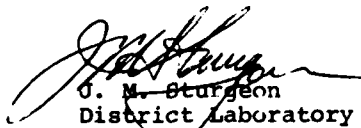
We have as yet not used dredged material in our fills. We have some future projects that could possibly put it to use. There are two in Monterey County. One, three miles from Moss Landing Harbor, needs 3,000,000 C.Y. One at Moss Landing itself needs about 500,000 C.Y. Moss Landing Harbor will be dredged soon and we are considering possible use of the dredgings.

Coordination of projects would certainly be a problem, but an even bigger one is the California Coastal Initiative Law. Although it permits the dredging of existing channels without securing a coastal zone permit, the placing of that material requires a permit and a 2/3 vote of the Coastal Commission.

Another possible use of dredgings, when they are sand, is as subbase material. Environmental concerns make this material scarcer each year. The material would have to be stockpiled for future use. Perhaps it could be sold to materials suppliers and thus avoid scheduling problems.

It would be a pity to lose this material source when construction materials are becoming so difficult to obtain.

Sincerely yours,


J. M. Sturgeon
District Laboratory Engineer

Attach.

NORMAN S. LIVERMORE, JR.
SECRETARY

RONALD REAGAN
GOVERNOR OF
CALIFORNIA

OFFICE OF THE SECRETARY
RESOURCES BUILDING
1416 NINTH STREET
95814

Department of Conservation
Department of Fish and Game
Department of Navigation and
Ocean Development
Department of Parks and Recreation
Department of Water Resources



Air Resources Board
Colorado River Board
San Francisco Bay Conservation and
Development Commission
State Lands Commission
State Reclamation Board
State Water Resources Control Board
Regional Water Quality Control Boards

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

OCT 11 1973

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OCT. 15 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, MD 21204

Dear Mr. Drabkowski:

Your letter of September 17 requested detailed information regarding potential use and new concepts for use of dredged materials in the coastal region of California. Your letter emphasizes the consideration of dredged materials as a resource. You also state that the U. S. Corps of Engineers (which has retained your firm for this study) annually dredges several million cubic yards as part of its maintenance work in California.

The questions you have posed are framed in such a way that it is not practical to provide specific answers. Instead, I will present our general views on potential uses of dredged materials.

Dredged materials have been widely used as a resource in California. Much of the development surrounding estuarine waters has been built on a base of dredged materials. Such development has reduced the tidelands of California to the point where they are becoming a critical resource. Thus, we have today a dichotomy--a potential use of dredged material as a land development resource versus the need to preserve remaining tidelands.

It is not possible to discuss potential uses of dredged materials in a way that would be uniformly applicable throughout the coastal region of California. In general, however, suitable dredged material can be used in many areas to rebuild eroding beaches. Another continuing use of dredged materials is the bolstering of

Mr. Edwin F. Drabkowski

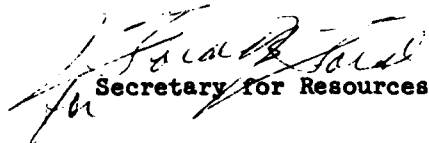
-2-

levees in our Sacramento-San Joaquin Delta area. There currently is a unique proposal by the Environmental Planning Corporation of San Francisco to utilize garbage, sewage sludge, and dredged materials to strengthen levees and rebuild land areas in the Delta.

The Resources Agency has a basic responsibility for the conservation, management, and use of the resources of the State. The Resources Agency is not, however, the land use planning and development agency of the State of California. We, thus, do not have long-range plans for development that might require large quantities of dredged materials for fill.

We recognize that the Corps of Engineers is having an increasing problem in finding areas for economic disposal of dredged materials. Because of the diverse dredging activities of the Corps and the various alternative disposal areas, we believe that each Corps of Engineers' dredging job must be studied as a separate project. In this manner, we can adequately weigh the social, economic, and environmental factors relating to each such project.

Sincerely yours,


Secretary for Resources

④



HUMBOLDT COUNTY ASSOCIATION OF GOVERNMENTS

CITY HALL - ROOM 209 - P.O. BOX 1018 - EUREKA, CALIFORNIA 95501 - PHONE (707) 443-7111

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SEP 17 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

September 14, 1973

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

Thank you for your letter of August 21, 1973, regarding dredging spoils. As the regional planning agency for Humboldt County, the Association is not directly involved in implementation of development projects and would have no direct use for dredging spoils. The Association would be able to encourage the use of dredging spoils for fill where projects have received appropriate federal, state and local approvals as well as environmental impact evaluation. To encourage indiscriminate filling would not be environmentally sound, however, stock piling of dredging spoils for future appropriate use may be highly desirable.

In reply to specific questions raised in your letter:

1. The Association has no direct use for dredging spoils. Pending completion of the mandatory California Coastal Plan, in late 1975, there would appear to be only very limited use of fill material. In the post-1975 time period; however, fill requirements should increase. Definitive amounts cannot be projected at this time.
2. The availability of fill material at reasonable costs could become a significant factor in planning for new development.
3. Fill material is presently being used to provide dike protection in low-lying areas. The dikes prohibit tidal waters from inundating pasture land; thus, an inexpensive

MEMBERS: COUNTY OF HUMBOLDT, CITIES OF ARCATA, BLUE LAKE, EUREKA, FERNDALE, FORTUNA, RED BLUFF, TRINIDAD

Edwin F. Drabkowski
September 14, 1973
Page -2-

dike can be built and maintained. A future use could be for fill in a land disposal solid waste system. Assuming the spoil can be acquired and transported inexpensively, the cost could be less than importing other cover material. The use of spoil for agriculture would require an intensive, detailed study. All spoil does not have the same natural or man-made components and this would probably determine the ability to use it for agricultural purposes.

4. Definitive amounts of fill needs cannot be projected.
5. No.
6. Not at this time; however, this condition could change as construction techniques and water pollution and solid waste disposal controls change.

Fill material could be used to upgrade certain open space and recreational areas. Any Corps fill material should be made available to governmental agencies prior to offering it to private enterprise.

If you have any questions, do not hesitate to contact me.

Respectfully,

HUMBOLDT COUNTY ASSOCIATION OF GOVERNMENTS

Jack Segal
Executive Officer



DWP:bc

5



1850 EAST HAZELTON AVENUE
STOCKTON, CALIFORNIA 95205
TELEPHONE (209) 944-2585

SAN JOAQUIN COUNTY COUNCIL OF GOVERNMENTS

August 22, 1973

Mr. Lee Moser
Green and Associates
32 West Road
Tawson, Maryland 21043

Dear Mr. Moser:

Enclosed are a couple items which briefly illustrate the project which is currently being formulated in the San Francisco Bay-San Joaquin Delta area. As you can see there will be a need for large quantities of dredger spoils if the demonstration project proves feasible.

If you need additional information or we can be of further service, please feel free to call upon us at any time.

Very truly yours,

PETER D. VERDOORN
Executive Director

PDV:ls

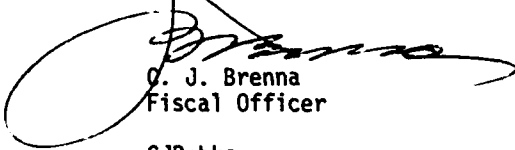
enc.

Mr. Edwin F. Drabkowski
October 8, 1973
Page 2

1. We do not, at the present time, have identified areas that need fill material. This identification is under consideration as part of our overall management plan and ownership boundary study.
2. Most of the areas, within the current reasonable cost of haul, has been filled to the extent necessary. Those areas which now remain are marginal economic lands for highly developed industry, housing, etc., and are outside the dense population centers and would require little development in the near future.
3. The creation of new lands.
4. Less than amounts which are generally available. Our current problem is not the need for material to create lands, but rather where and how to dispose of dredge material removed for navigational needs.
5. We do not have a single report of dredge spoil or fill material.
6. No.

Sincerely,

DIVISION OF STATE LANDS
William S. Cox, Director



C. J. Brenna
Fiscal Officer

CJB:bks
Enclosures



October 12, 1973

Mr. Ray Bartlett
Mid-Columbia Economic Development Dist.
502 E. 5th County Courthouse Annex
The Dalles, Oregon 97058


Spoil Dump Area

Dear Mr. Bartlett:

As a result of your inquiry the Port of Cascade Locks has researched potential dump sites for dredge material and we anticipate that from 1 to 2 million yards of material could be disposed of on Port Property. This of course would depend upon the quality of the material.

Thank you for your inquiry.

Sincerely,



Ronald L. Rombalski
Manager

RR/bi

MID-COLUMBIA ECONOMIC DEVELOPMENT DISTRICT

WASCO COUNTY COURTHOUSE ANNEX B
THE DALLES, OREGON 97058

502 EAST FIFTH STREET

TELEPHONE 503 - 296 2244

RECEIVED

NOV 10 1973

November 6, 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

Enclosed are letters from two of the five port districts in the Mid-Columbia area who request the use of dredge spoils resulting from channeling and construction work at the Bonneville Dam. In addition to the letters and maps enclosed, the port of the Dalles, at the Dalles Oregon, could use up to 1.5 million cubic yards on their industrial property on area to the South and East of Craits Point on the Columbia River. In addition, the port of Klickitat County could use from 1.5 million to 3 million cubic yards of fill material on their port properties. Their properties are located in Bingen Washington and to the West of Bingen Washington and East of the Hood River toll bridge. A letter depicting the details of dredge spoils in that area will be sent to you within a week. I have enclosed a small scale map indicating the approximate location of the port properties involved.

I hope this information is helpful to you in developing a plan for the disposal of the 13.6 million cubic yards of dredge spoils, resulting from U. S. Army Corp. of Engineer projects on the Bonneville pool. If there are any further details you require, please contact myself or the respective ports.

Sincerely Yours,

Raymond J. Bartlett
Raymond J. Bartlett

RB:k

CC: Port-Cascade Locks
Port-Skamania Cty
Port-Klickitat Cty
Port-The Dalles



OREGON STATE
LAND BOARD

TOM MCALL
Governor

CLAY MYERS
Secretary of State

JAMES A. REDDEN
State Treasurer

—
WILLIAM S. COX
Director

**DIVISION OF
STATE LANDS**

OFFICE OF THE DIRECTOR

502 WINTER STREET NE. • SALEM, OREGON • 97310 • Phone 378-3805
October 8, 1973

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, MD 21204

Dear Mr. Drabkowski:

Dredge Spoil Study

Fill material dredged from the Willamette and Columbia Rivers has been extensively used in the past to create new lands, and to develop marginal lands. This has occurred in various economic areas including the Port of Portland, commercial businesses, and private interests.

The State of Oregon, Division of State Lands, is the fee owner of the bed of all navigable waters and is entitled to a royalty for the resource consumed. In the past years, millions of cubic yards of material were dredged and used as fill with no royalty being received by the State of Oregon, except when the fill was made on state-owned submerged or submersible lands, and in those cases the lands were sold as new lands.

Environmental impact on the resource has now reduced the uncontrolled use of dredge materials to fill lands within the bed or banks of any waterway of this State. The same environmental impact applies to the removal of material from the waters, except for the removal of material by the Corps of Engineers for navigational maintenance.

Your inquiry lists several questions, and I shall answer them in the same sequence:

5
RECEIVED

OCT 11 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.



TOM McCALL
GOVERNOR

DIARMUID F. O'SCANNLAIN
Director

**DEPARTMENT OF
ENVIRONMENTAL QUALITY**

1234 S.W. MORRISON STREET • PORTLAND, ORE. 97205 • Telephone (503) 229-5256

6
RECEIVED
SEP 21 1973
GREEN ASSOCIATES, INC.
BALTIMORE, MD.

September 12, 1973

Mr. Edwin F. Drabkowski
Green Associates, Inc.
32 West Road
Towson, MD. 21204

Dear Mr. Drabkowski:

This is in response to your letter of September 4, 1973 in which you ask several questions about dredge spoils as a possible usable resource in Oregon. I shall attempt to answer your questions in the same numerical order that you have expressed them.

1. Our agency neither owns lands nor has jurisdiction over any lands that would require filling.
2. Oregon has utilized millions of cubic yards of dredge spoils to fill industrial sites, roadways and recreational parks. Unfortunately our supply of dredge spoils far exceeds the availability of acceptable disposal sites. In most cases the spoils are available at give-away prices and there are no takers.
3. Most of the dredge spoils from channel maintenance in the lower Columbia River are composed of masonry grade sands. Only a fraction of the available supply is utilized. Perhaps these could be barged to other population centers along the west coast.

Elsewhere in Oregon the dredge spoils consist mostly of organic oozes, silts, and fine sands that would blend well to improve coastal and valley clay soils if properly mixed.

4. No determination has been made on the future need for dredge spoils. As I have said, our problem is an over supply rather than a need.

DEQ-1

Edwin Drabkowski

- 2 -

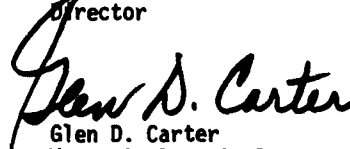
September 12, 1973

5. Here again, I don't know of any published reports on the use of or need for fill material in our local area. There are reports dealing with plans for future spoils disposal. Most are merely listings of the few remaining possible sites for disposal. At best, it is a bleak picture of scarcity.
6. A lack of landfill or disposal sites and an oversupply of fill materials is our greatest obstacle in navigation channel maintenance programs.

I might add that the Corps of Engineers is well aware of the above stated local problems, since it is their projects that produce most of the spoils.

Very truly yours,

DIARMUID F. O'SCANLAIN
Director


Glen D. Carter
Water Quality Analyst

GDC:lb



COLUMBIA REGION ASSOCIATION of GOVERNMENTS

6400 S.W. CANYON COURT
PORTLAND, OREGON 97221

(503) 297-3726

October 4, 1973

RECEIVED

OCT 9 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Erwin F. Drabkowski
Green Associates, Inc.
32 West Road
Towson, M.D. 21204

Dear Mr. Drabkowski:

In reply to the questions raised in your letter to
Mr. Charles C. Kemper, of August 29, 1973:

1. The Columbia Region Association of Governments (CRAG) does not have any plans to develop areas that will require the need for (dredged) fill.
2. CRAG does not anticipate official endorsement of ~~planning~~ ^{development} in flood plain areas where such fill materials are required. However, the use of such materials for improving structural foundations in non-flood plain areas would be attractive.
3. There are probably no "unique" uses of fill material except perhaps for sanitary landfill cover.
4. We have no estimates of fill material needs but we suggest that the following agencies be contacted:

Port of Portland and other Port districts.
Oregon State Highway Division
Washington State Highway Division
5. Land use plan map and others are enclosed.

CLACKAMAS COUNTY

Canby
Clatskanie
Happy Valley
Lake Oswego
Milwaukie
Oregon City
West Linn

CLATSOP COUNTY

Clifton
Vancouver
Washouak

COLUMBIA COUNTY

Clatskanie
Columbia City
Crescent
Hermiston
Scappoose
St. Helens
Veneta

MULTNOMAH COUNTY

Fairview
Gresham
Portland
Tigard
Wood Village

WASHINGTON COUNTY

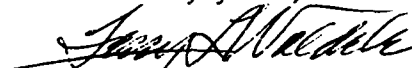
Beaverton
Canby
Clatskanie
Forest Grove
Hillsboro
North Plains
Sherwood
Tigard
Tualatin

Mr. Erwin F. Drabkowski
October 4, 1973
Page 2

6. One of our largest producers of construction aggregates is threatened with closure of his facility, representing a 30% reduction in aggregate production in the Portland SMSA.

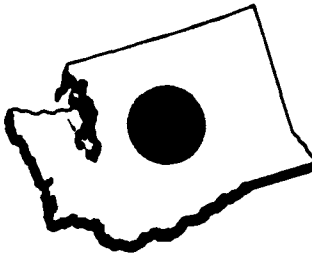
We suggest you contact Howard Needles, Tammen and Bergendorf for information on their current study of mineral resources in our area.

Sincerely yours,



Terry L. Waldele
Senior Engineer

TLW/jw
encls.



STATE OF WASHINGTON
Department of
Natural Resources

Received
Sept. 13, 1973
COMMISSIONER
BERT COLE

DON LEE FRASER
SUPERVISOR

Route 3, Box 1
Ellensburg, Washington

(13)

September 7, 1973



Green Associates
32 West Road
Towson MD 21204
attn: Edwin F. Drabkowski, Project Manager



Dear Mr. Drabkowski:

Your letter of August 29, 1973, to Klickitat Regional Planning Council has been referred to this office for comment.



The Department of Natural Resources manages all river and lake bottoms of navigable waters for the State of Washington. As manager of these lands, we have worked with the Corps of Engineers to provide them with dredging spoil sites. We have provided sites for storage of material we hope to sell and we have in some areas allowed filling adjacent to shoreland to develop lands suitable for commercial or recreational development.



The Southeast Area of Department of Natural Resources manages all lands in southeast Washington as shown on the attached map. We plan to continue our cooperative effort with the Corps of Engineers to have all spoils deposited where they will most benefit the State of Washington. In case we have no specific planned use of the material, we will consider sales to other agencies or to individuals who want the spoils.



Please contact this office if you need added information.



Very truly yours,
Bert L. Cole, Commissioner



By Charles Haight
Assistant Area Manager
Southeast Area

CRH:dw
cc: Ralph Beswick-Survey & Marine Land Management



**REGIONAL PLANNING COUNCIL
OF CLARK COUNTY**

2400 "T" STREET

VANCOUVER, WASHINGTON 98661
PHONE 1 206 695-3361

September 28, 1973

RECEIVED

TOM JENKINSON
PLANNING DIRECTOR

OCT 5 1973

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Subject: Dredge Spoil Study

Dear Mr. Drabkowski:

The following information is provided in response to questions put forth in your letter of August 29, 1973.

1. This agency does not have any adopted plans for the development of areas which will require fill. A number of other agencies, however, do have projects in progress or under consideration which involve considerable fill. The Port of Camas-Washougal will soon fill a 50 acre tract for industrial development with spoils dredged from the nearby Columbia River. In this same vicinity, the State Parks and Recreation Commission is proposing park development for all of Reed Island, some of which may be filled with spoils from maintenance dredging of the navigation channel.

The Clark County Parks Department is developing a park site along the west side of Vancouver Lake for which approximately 20,000 cubic yards will be borrowed from nearby stockpiles. On a much larger scale, the Port of Vancouver, Corps of Engineers and Clark County are entangled in a proposal to dike, fill and develop for industrial purposes a considerable area in the Columbia River-Vancouver Lake lowlands. This project would utilize spoils not only from the river but also from the bed of Vancouver Lake which is shallow, polluted and in need of improvement. Since considerable controversy surrounds this proposal it may be some time, if ever, before the project can be undertaken.

2. Although the availability of useable land is not an overriding problem, recent trends have been to contain development and to discourage the use of unsuitable land for building sites. And, while both land and water sources of fill material are available, utilization of these resources is not only an economic, but moreover, an environmental problem.

■ CLARK COUNTY ■ CITY OF VANCOUVER ■ CLARK COUNTY PUBLIC UTILITY DISTRICT ■ VANCOUVER SCHOOL DISTRICT
■ EVERGREEN SCHOOL DISTRICT ■ CENTRAL LABOR COUNCIL ■ VANCOUVER CHAMBER OF COMMERCE ■ CITY OF RIDGEFIELD
■ CITY OF BATTLEGROUND ■ VANCOUVER HOUSING AUTHORITY ■ CLARK COUNTY SEWER DISTRICT NO. 2 ■ CITY OF LA CENTER
■ CLARK SKAMANIA SOIL & WATER CONSERVATION DISTRICT ■ CITY OF CAMAS ■ CITY OF WASHOUGAL ■ PORT OF VANCOUVER

Aside from these considerations, it appears that the port and industrial interests would be the only major users of readily and economically available fill material.

3. In addition to the creation of dry upland areas for site development, extensive use of fill material for highway road beds and dike and berm construction is common in this area. If dredging of Vancouver Lake should ever occur, the bed material could possibly serve as good agricultural topsoil because of its high organic content. Columbia River bed materials are not only utilized for fill material, but extensive deposits of sand and gravel are dredged by the Willamette Hi-Grade Company for use in the production of Portland Cement and other concrete products.

4. The Port of Camas-Washougal will dredge 300,000 cubic yards of spoils to fill their 50 acre industrial tract. This compares with 665,000 cubic yards which the Port dredged and deposited within the same vicinity in 1969. Upon completion of this current project an additional 50 or 60 acres of Port-owned property would remain low and wet. The Port of Camas-Washougal also has hopes of someday dredging a deep-water harbor facility in the general vicinity downstream from the industrial park.

In addition, over 400 acres of marshland lies immediately east of the Port industrial area. While this private property is presently zoned for heavy manufacturing, it serves as a nesting ground for waterfowl and an overflow area for extreme runoff, and will probably be maintained for these uses. The amount of fill material necessary to develop the lower Columbia River wetlands has not been determined, but the project would involve 5,800 acres. All of this area would have to be diked and much of it filled.

5. At this time our land use and slope analysis maps are not available in reproducible form. We could, however, provide prints of both 7.5 and 15 minute USGS quadrangles if you feel these would be helpful.
6. We have not encountered any problems in terms of a lack of landfills or construction materials. We should add that the State of Washington is operating under a Shoreline Management Program which establishes a review and permit procedure for projects such as dredging and filling of wetlands. This program also urges local governments to develop long range plans for the deposit and use of spoils on land - a project which we may be undertaking over the next year, and for which the information you are gathering may be helpful.

Mr. Drabkowski
Page 3

I sincerely hope this provides the type of information you are seeking.

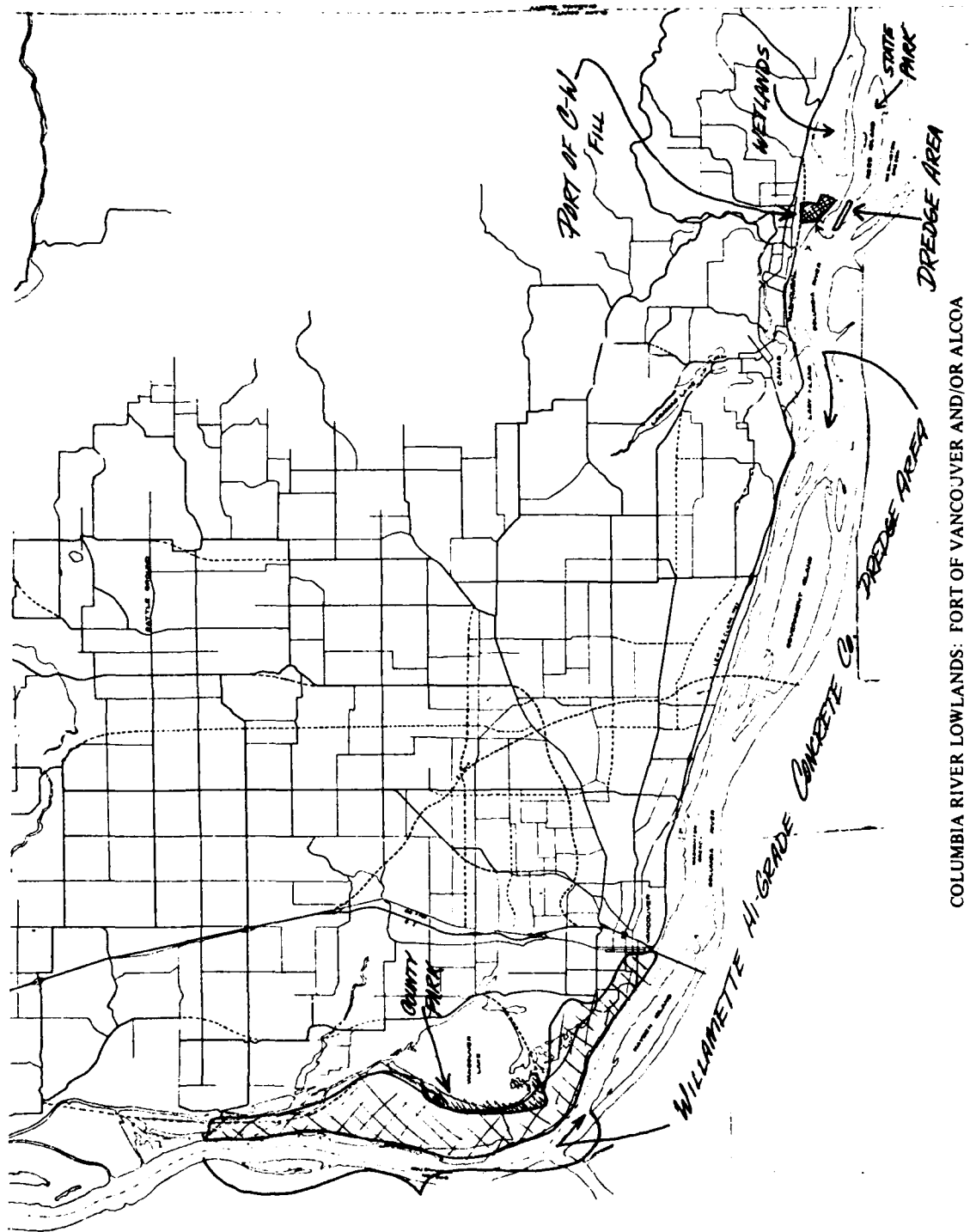
Yours truly,

T. Jenkinson,
Planning Director

A handwritten signature in cursive script, appearing to read "Richard W. Hines".

Richard W. Hines,
Planner III

TJ:RWH:tc
Enclosure



COLUMBIA RIVER LOWLANDS: FORT OF VANCOUVER AND/OR ALCOA

(2)

PORT OF SKAMANIA COUNTY

P.O. Box 413

STEVENSON, WASHINGTON 98648

Larry Hendrickson
Manager

Phone 509 427-5484

October 24, 1973

Raymond J. Bartlett, Assistant Director
Mid-Columbia Economic Development Dist.
502 East 5th St.,
The Dalles, Oregon 97058

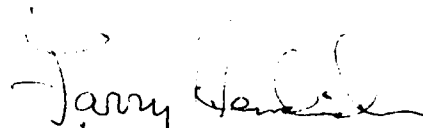
Dear Mr. Bartlett:

Pursuant to your inquiry about using dreg spoils on Port of Skamania County Property, I have the following comment.

If the spoils are of useable quality we could use approximately 1.5 million cubic yards on our 45 acre industrial site at Stevenson. Presently the Corps of Army Engineers owns a flowage easement over part of the land. Our plans call for raising the land above the 100 year flood plain and developing it for industrial and commercial useage. I am enclosing a photo copy of the land area involved.

I would appreciate being informed of any response back from the Corps or their consultant.

Sincerely yours,


Larry Hendrickson
Manager

LH:RB:w

Received
Sept. 10, 1973 (1)

GRAYS HARBOR REGIONAL PLANNING COMMISSION

207 1/2 EAST MARKET • 532-8812 • ABERDEEN, WASHINGTON 98520

September 7, 1973

Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
TOWSON, Maryland, 21204

Dear Mr. Drabkowski:

Your letter of August 29 regarding your dredge spoil study has been referred to Mr. Gerald van Deene of the Port of Grays Harbor so he can supply information which they have on the questions you raised. From the information available to us the following comments can be supplied.

A copy of the adopted Regional Land Use Plan which schematically identifies the projected distribution of land uses in the 20 year plus planning period is enclosed. Three areas have been denoted in red where present and future dredge spoil deposition is being used to create developable land at an elevation above flood-tide. In the Westport area no decision has yet been reached on whether to raise the existing airstrip (now flooded regularly in winter) or to create another boat basin in that same area and establish a new airstrip on the boundary bulkhead for the boat basin. That decision will determine the type and amount of dredge spoil fill that might be needed.

The area on the north side of the harbor has been used for dredge spoils in the past and through use of dikes can be filled to a height equivalent to the airport and used for future industrial expansion in connection with the airport. The third area has already been used for dredge spoils but considerable additional fill will be needed to raise it above flood-tide. The land use map projects additional industrial areas west of Bowerman Airport and along the south harbor but newly adopted shorelines management requirements and rethinking of industrial needs suggests that these designations may not be desirable (shown in green) *potential site*.

Although a dike is proposed around South Aberdeen and Cosmopolis the areas shown in blue have been subject to periodic flooding and it is expected that even with dike protection property owners will want to add fill to backyards and new building sites to get their homes and gardens above the

Edwin F. Drabkowski
September 7, 1973
Page 2

groundwater and local drainage problems. If dredge spoils are sufficiently fertile and do not contain undesirable contaminants there might be some need for this resource on agricultural lands upstream where winter flooding removes considerable amounts of topsoil. And, there are still a few low sites along the industrial water front in the urban area where limited amounts of fill could be utilized to raise the level of the site. Other suggestions for using these spoils need considerable more study. They are: (1) feeding sand to the beaches north and south of the harbor, particularly north of Copalis Beach; and (2) creating artificial marshes and islands in the north and south bay portions of the harbor to create additional wildlife habitats.

For the topographical analysis the only maps we can suggest are the USGS Quads, the USC & GS chart of Grays Harbor (No. 6195) and the detail maps used in the Corps of Engineers Flood Plain Study of Aberdeen, Hoquiam and Cosmopolis. A copy of the Interim Flood Plain Plan is enclosed to provide some background information that may be of value in your study. There are no up-to-date existing land use maps for the county as a whole. Current inventories are available for Aberdeen and Hoquiam but these are not reproducible. A copy of the old land use inventory used to formulate the Aberdeen Comprehensive Plan in 1968 is enclosed to give a general idea of the area but should not be considered accurate.

Special problems which are encountered locally are the need to use friction piling under all but residential construction in the harbor lowlands. Also, local sand and gravels are poor in quality and deteriorate quickly. The exception is beach sand and its extraction is restricted.

I look forward to hearing more about the progress of your analysis. If we can be of help please let me know.

Sincerely,

GRAYS HARBOR REGIONAL PLANNING COMMISSION



Russell Nebon
Director of Planning

Enclosures



PORT OF
GRAYS HARBOR

P. O. BOX 660, ABERDEEN, WASHINGTON 98520

TELEPHONE 206 533-3620

RECEIVED
SEP 12 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

COMMISSION

JOHN A. EARLEY
President

HANS M. BIELSKI
Vice-President

JOHN K. YEAROUT
Secretary

E. W. CLOCKSIN
Manager

HENRY E. SOIKE
Manager
Industrial Development

September 10, 1973

Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Attention: Mr. Edwin F. Drabkowski

Re: Dredge Spoil Study, Your Contract No. 8173

Gentlemen:

Mr. Russ Nebon forwarded to us a copy of your letter to the Grays Harbor Regional Planning Commission, dated August 29, 1973, for comment.

In our area dredging spoils constitute a disposal problem, rather than a resource. Traditionally, these spoils have been used to reclaim tidelands. In effect major parts of the cities of Aberdeen and Hoquiam are built on landfills created by sawmill waste and/or dredging spoils. West of the City of Hoquiam, several hundred acres of filled land are available for industrial development, which however has been slow to materialize.

Although the major part of spoils, generated by maintenance dredging, continues to be disposed in this manner, increased awareness of the ecological value of tidelands has made this practice objectionable to environmental agencies of State and Federal Government, in particular, the Bureau of Sport Fisheries and Wildlife. As Mr. Nebon has probably told you, upland fill sites are very hard to find within economical distance from dredging locations. And, although undoubtedly there are some upland sites around that could be improved with fill material, the quantities required fall far short of the quantities dredged.

In short: considering dredging spoils as a resource is not realistic in our area under present conditions.

Sincerely,

G.J. van Deene
Port Engineer

GJvD:seb

cc: Russ Nebon, Grays Harbor Regional Planning Commission
207-1/2 East Market Street, Aberdeen, WA. 98520

A133



GRAYS HARBOR COLLEGE

Community College District No. 2
Telephone (206) 532-9020
ABERDEEN, WASHINGTON 98520

Dr. Joseph A. Malik
President

September 17, 1973

Mr. Russell Nebon
Assistant Director
Group Regional Planning Commission
207 1/2 E. Market Street
Aberdeen, WA 98520

RECEIVED
SEP 21 1973
GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Dear Mr. Nebon,

We here at Grays Harbor College have several ideas on the use of dredge spoils as a resource.

1. We applaud the approach from a resource rather than a disposal direction.
2. Use of landfill to "develop" new areas can have serious biological consequences. Usually the developed area was occupied by tidal flats, marshes, or fowlands. This always involves a rich productive organic layer being covered and smothered by a less productive layer. Perhaps too much of this has already occurred.
3. In an agricultural sense, much of the soil in our area could benefit from the addition of the sandy fractions of dredge spoils. Leaching out of salts should not be an insurmountable problem.
4. Perhaps methods could be worked out to make dredge spoils sands suitable for mulching in the cranberry industry. This would make the taking of beach sand unnecessary.
5. Dredge spoils perhaps could be added to our outer beaches to replace losses due to longshore drift. This might stabilize beaches at their present level.
6. Locally, warm-water bathing spots are almost non-existent. Perhaps inner bay locations could be treated with dredge spoils to create public bathing beaches.
7. We recommend that certain sections of dredge spoils be

analyzed for economically valuable mineral content.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Louis Messner", with a stylized flourish at the end.

Louis Messner
Chairman of the Biological
Science Division

cc: Green Associates
Port of Grays Harbor
U.S. Army Corp of Engineers

LM:lb



**Pacific County
REGIONAL PLANNING COUNCIL**

Courthouse Box 66
SOUTH BEND, WASHINGTON 98586

Received
Sept 11, 1973

(4)

September 5, 1973

Mr. Edwin F. Drabkowski
Green Associates, Inc.
32 West Road
Towson, MD 21204

Dear Mr. Drabkowski:

The following is a response to your letter of August 29, 1973. I am sorry that a more detailed response could not have been given. I have paraphrased your questions prior to answering.

1. Q. As a regional planning agency, do you have any short or long range plans to develop areas that will require the need for fill?
 - A. No. The regional planning agency has not prepared plans for the development of specific areas. The Port of Willapa Harbor, on the other hand, owns land which is made available for dredge spoils. It is the Port's wish to use this land for industry ; however, without having an industry in mind, the extent, quantity or need for fill remains an unknown. At present the Port is actively seeking industries that will locate on sites that are already filled.
2. Q. If fill material was readily and economically made available, could you use such material in future planning (i.e., creating areas for economic development such as industry, agriculture, housing, recreation, etc.)?
 - A. A use for fill material can always be found irrespective of any land allocation program that can be developed by a planning agency. The important charge of the planning process is to develop criteria and standard designed to minimize the adverse effects posed by dredge fill activities. This is being accomplished in connection with the development of the County's Shoreline Master Program.
3. Q. In your planning area, what unique use could be made of fill material?
 - A. The only activity that has been given a thought is the use of dredge spoils as cover material and/or foundation fill material in connection with the operation of a sanitary land fill.

Mr. Edwin F. Drabkowski
September 5, 1973
Page 2

4. Q. Where fill material can be used in future developments, how much would be needed?
- A. Based on the policies of the controlling planning agency in Pacific County, the location of future development is such that if fill is required, the location is improper. Under this policy there is a limited need for fill as dictated by the special conditions of specific sites.
5. Q. Can you supply us with a copy of your existing land use, topography (slope analysis) and future land use maps?
- A. The following is a list of materials and prices:
- | | |
|---|---------|
| Pacific County Preliminary Land Use Plan | \$10.00 |
| Pacific County Shoreline Master Program | .75 |
| Water Pollution Control and Abatement Plan,
Dredging Element | 1.25 |
- Your order for materials should be accompanied by check or money order payable to Pacific County. There is a 5% sales tax in this state.
6. Q. Are special problems locally encountered in terms of a lack of landfills or construction materials.
- A. The most significant lack of landfill or construction material in the area is the lack of good aggregate for road building.
7. Q. If direct use of fill or dredged spoil material is being made in your area, we would be pleased to receive a report or description of this use.
- A. Dredge spoils has historically been used for filling marsh lands and tide lands for agricultural and urban uses.

Sincerely,

PACIFIC COUNTY REGIONAL PLANNING COUNCIL

Kenn Kimura
Kenneth Kimura
Planning Director

KK:eb

*Sufficient examples
are available from
George H. H. H.*

(5)

CLALLAM COUNTY PLANNING COMMISSION

COUNTY COURTHOUSE
PORT ANGELES, WASHINGTON 98362

September 7, 1973

RECEIVED

SEP 11 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

RECEIVED

SEP 9 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Green Associates, Inc.
32 West Road
Towson, MD 21204

ATTN: Edwin F. Drabkowski

Gentlemen:

The following information is given in answer to questions regarding your dredged spoil study, Contract 8173.

1. As a regional planning agency, do you have any short or long range plans to develop areas that will require the need for fill?

Only one area requires fill. This is Ediz Hook, which protects the Port Angeles harbor. A Corps of Engineers study shows that a beach feeding program is the best solution to erosion on the hook.

2. If fill material was readily and economically made available, could you use such material in future planning (i.e., creating areas for economic development such as industry, agriculture, housing, recreation, etc.)?

Generally, no. Furthermore, our pending policies under the Shoreline Management Act would prevent the filling of wetlands for these purposes.

3. In your planning area, what unique use could be made of fill material?

None, except for the project described under question 1.

4. Where fill material can be used in future developments, how much would be needed?

108,000 cubic yards initially, followed by 13,000 cubic yards annually.

5. Can you supply us with a copy of your existing land use, topography (slope analysis) and future land use maps?

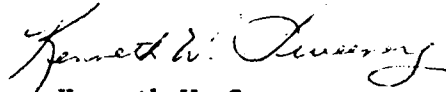
No. Existing land use maps are single copy field sheets. Future land use maps are now under preparation.

6. Are special problems locally encountered in terms of a lack of landfills or construction materials?

Yes. The county engineer informs me that good sources of gravel throughout the county are needed but are difficult to find. Also, a source of good rip-rap material is needed.

I hope this information will be useful to you.

Sincerely,


Kenneth W. Sweeney
Planning Director

KWS:sr

**WASHINGTON
STATE**

DEPARTMENT OF COMMERCE
AND ECONOMIC DEVELOPMENT
GENERAL ADMINISTRATION BLDG.
OLYMPIA, WASHINGTON 98504

Daniel B. Ward DIRECTOR
Daniel J. Evans GOVERNOR

DEVELOPING THE ECONOMY THRU • TOURISM • INDUSTRY • RESEARCH • FOREIGN TRADE • NUCLEAR PROGRESS



⑥

November 2, 1973

RECEIVED

NOV 5 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

In response to your letter of September 17, 1973, I circulated copies to all our Department field representatives, our Department of Highways, Department of Agriculture, and Department of Ecology. Unfortunately, I haven't received too much feedback. Enclosed are copies of what I did receive for what it is worth.

There are many locations in the state along the waterfront where fill is needed before the site can be put to any useful purpose. However, we now have in effect a new Shorelines Management Act which requires a very lengthy and expensive permit process before anything can be done within 200 feet of any shoreline. This, combined with other permits previously required, has very effectively slowed down any new developments in these areas. Environmentalists continually question whether it is wise to fill tide lands or low-lying areas. So aside from one approved project on the Swinomish Indian Reservation near Anacortes, we are not aware of any major projects requiring fill. The Corps of Engineers is already aware of that project. Sorry that we can't be of more help in this matter.

The only new use that comes readily to mind would be as a cover material for land fill garbage disposal sites. We now have laws in this state which ban all open burning dumps. In this respect, we have a large strip-mining operation for coal underway for the large steam power plant near Centralia.

SEATTLE OFFICE:
312 FIRST AVE. NO. (98109)

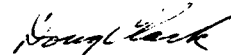
SPOKANE OFFICE:
ROOM 307, GREAT WESTERN BLDG. (99201)

Mr. Edwin F. Drabkowski

2.

There have been many who feel this would be an excellent garbage disposal site for a large population area. It would still require some kind of material for a cover. This sort of use would be working with instead of against the environmentalists, so it might get further.

Sincerely,



Doug Clark
Investment Services Division

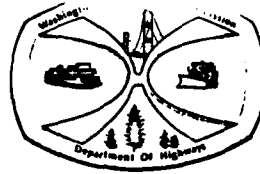
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WASHINGTON STATE

HIGHWAY COMMISSION

DEPARTMENT OF HIGHWAYS

Highway Administration Building
Olympia, Washington 98504 (208) 753-8000



Daniel J. Evans - Governor
C.H. Andrews - Director

October 16, 1973

Mr. Doug Clark
Investment Services Division
Department of Commerce and Economic Development
General Administration Building
Olympia, Washington 98504

Dear Mr. Clark:

Referring to your memorandum of October 5, 1973 and the attached letter from Green Associates, Inc., please be advised that our uses for dredge spoils are limited to specific projects where such material would be available and competitive in cost to other material sources. It is not possible for us to forecast the potential uses far in advance of actual projects. Of the six questions posed, we could answer No. 2 to the affirmative provided we had a project planned in the area and question 6 to the affirmative on occasion. Here again, we would have to relate this to a specific project.

In summary, we can offer little assistance to Green Associates in their endeavor.

Very truly yours,

H. W. HUMPHRES, P.E.
Assistant Director for
Construction and Materials

HWH:me

OCT 17 1973

WASHINGTON

STATE
DEPARTMENT OF COMMERCE
AND ECONOMIC DEVELOPMENT
GENERAL ADMINISTRATION BLDG.
OLYMPIA, WASHINGTON 98504

Daniel J. Ward DIRECTOR
Daniel J. Ward GOVERNOR

DEVELOPING THE ECONOMY THRU • TOURISM • INDUSTRY • RESEARCH • FOREIGN TRADE • NUCLEAR PROGRESS



October 5, 1973

TO: Mr. Vernon Divers, Supervisor
Agricultural Development
Department of Agriculture

FROM: Doug Clark
Investment Services Division

Attached is a letter from Green Associates, Inc. who has been given the assignment of finding new uses for dredge spoils by the U.S. Army Corps of Engineers. If you could supply any information relating to the questions they have raised, please let me know. My phone number is 753-3065.

Thank you.

Doug Clark

DC:79/3

Attachment

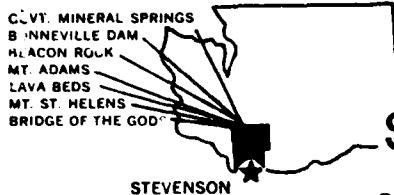
Doug: We have no input for this study, but it seems to me that the following agencies would have some suggestions:

- 1. County extension agents in ~~selected~~ areas where dredging takes place.*
- 2. Columbia-Pacific Resource ~~and~~ Conservation and Development Project, Raymond, Wa.*
- 3. SW Wash. Water Resources Study, Dept of Ecology, coordinator.*

OCT 10 1973

SEATTLE OFFICE:
315 • 1ST AVE. NO. (98109)

Vern
SPOKANE OFFICE:
ROOM 307, GREAT WESTERN BLDG. (59201)



Parks and Recreation Board for SKAMANIA COUNTY

P. O. BOX K • STEVENSON, WASHINGTON 98648

①

4 October 1973

RECEIVED

OCT 9 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, MD 21204

Dear Mr. Drabkowski:

A copy of your letter addressed to Mr. F. F. Dinsmore regarding the disposal of dredged spoils has been submitted to my office for our consideration.

At present the Skamania County Parks and Recreation Board is considering several improvements to existing and proposed park sites. County sites that could benefit from a fill program would include the following:

1. Wind River Boat Ramp
2. Rock Creek Fair and Park Grounds
3. Drano Lake Boat Ramp
4. Big White Salmon River

In addition, the Washington State Park Commission is also contemplating some major development of sites in the county under their control. The two State Park sites located along the Columbia River in Skamania County are Beacon Rock State Park, and the planned park slated for development at Home Valley.

From the standpoint of local park needs the answers to your questions are:

1. Yes, we will need fill for short and long range plans.
2. Yes, we could use fill for development of recreational sites.
3. Other than fill material, the only other use the park department could make of the spoils is for filling or top dressing required at other park sites. The County is not blessed with an adequate supply of good top soil so there is a possibility that a top soil building program utilizing spoils as an additive to other natural materials could provide us with a source of the required top soil.
4. No volume estimates have been figured out at this time, however, it would be over 200,000 cubic yards for the County Park Sites.
5. I have asked the Planning Department to send you copies of the available maps.
6. Yes, there is a lack of washed sand and top soil in our area.

GEORGE CHRISTENSEN

LLOYD LASSEY

LES HASTINGS

MRS DINGEMAN BAJEMA

MRS ALLEN TIFFANY

FRANCIS DAILEY

DAVID BRUHN

-2-

I hope that this information will be of use to you. For information on the State Park sites, I suggest you contact the Park Commission office in Olympia.

Yours truly,

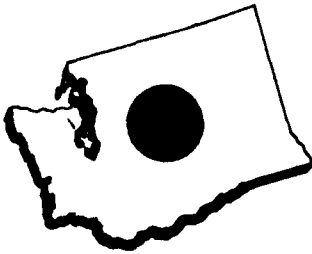
Bryan Snell

Bryan Snell
Parks Director

BES:pz

cc: Planning Director
County Engineer
Ray Bartlett

A145



STATE OF WASHINGTON
Department of
Natural Resources

⑧ #②

COMMISSIONER
BERT COLE

DON LEE FRASER
SUPERVISOR

OLYMPIA, WASHINGTON
98504

October 5, 1973

RECEIVED

SEP 19 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Gentlemen:

I am enclosing selected materials relative to the matter of dredge spoil disposal in Washington State. The following is in response to your September 17th inquiry, where you asked a series of questions.

Question 1 - The Department of Natural Resources is the designated proprietor of the State owned beds and shores of navigable waters in Washington. In the past we have organized an interagency committee to deal with the matter of selecting disposal sites for dredge spoil. As soon as the data produced by the Olympia dredge spoil disposal study is available, we will reconvene this interagency committee to address the question of dredge spoil disposal in the marine areas of Puget Sound, Grays Harbor and Willapa Bay. The purpose of that effort will be to develop spoil management programs for each maintenance project. We recognize this as somewhat ambitious, but are optimistic, at least at the moment, as to the outcome.

In addition to the above program for marine areas, we will be organizing this winter an Interagency Task Group to develop land use allocations for the State owned lands along the Columbia River below Bonneville Dam. Among other questions addressed by this group, will be the proper utilization of available dredge spoil and the development of a spoil disposal plan for the lower Columbia.

Question 2 - In order to do a better job of spoil management in the flood plain, we are experimenting with a stock-piling approach near Everett. I have enclosed descriptive material labeled as Smith Island Spoil Disposal Management Site. We have approximately 40,000 dollars committed to



Green Associates, Inc.
October 5, 1973
Page 2

this project which we expect to recover through sale of material, and will maintain a virtually permanent stockpile site onto which Corps spoil can be deposited and then subsequently be removed from the flood plain for various uses in the vicinity.

Question 3 - Sand and gravel that is produced as a result of construction projects, could be used for improving the substrate to enhance shellfish production. It could also be used to elevate shallow subtidal areas sufficiently to increase the acreage of intertidal area, thereby increasing the area available to produce clams for public taking. We are also interested in the conversion of selected relatively unproductive subtidal areas into marsh or island bird habitat.

Question 4 - Our plans are not sufficiently developed to enable me to respond to this.

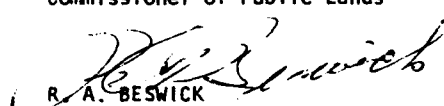
Question 5 - Materials enclosed.

Question 6 - In this day and age the generation of spoil as a result of navigation projects and the subsequent disposal problems, are more difficult to solve than the finding of material for landfills.

If we can be of further assistance please feel free to call on this office.

Very truly yours,

BERT L. COLE
Commissioner of Public Lands


R. A. BESWICK
Supervisor
Surveys & Marine Land Management

RAB:nr
Enclosures



PHONE 426-1351
AREA CODE 206



JAMES E. CONNOLLY
DIRECTOR

MASON REGIONAL PLANNING COUNCIL

P.O. BOX 400 • COURTHOUSE
SHELTON, WASHINGTON 98584

RECEIVED

October 10, 1973

OCT 15 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

Mr. Edwin F. Drabkowski
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

Dear Mr. Drabkowski:

My apologies for the delay in answering your letter of August 29, 1973.

My answers will have to reflect the State and local policy resulting from the passage of the Shoreline Management Act of 1971. This act discourages man-made intrusions in the waterways of the State. I do not expect to see any great use of dredge spoils used as fill materials along our shores, especially when the prime reason for such a fill is that it is the cheapest method of disposal. Considering dredge materials as a resource is going to be difficult. In the past they have been more of a disposal problem than an asset.

With background in mind you can see that we have not made any plans to develop areas where fill material is required. Many years ago the industrial area of Shelton was developed on tidelands with dredged materials but any further filling will be discouraged. Also, many homes are built on bulkheads and fills along our marine waters but this has been halted. I do not foresee any need for fill materials for future developments. The only unique use I can even suggest would be to use it as top soil to upgrade some of our very rocky soils. Even then the costs would probably prohibit such use.

I am enclosing some maps of Shelton and Mason County for your use.

Sincerely,

James E. Connolly
Mason Regional Planning Director

JEC:ve
Enclosures

KLICKITAT COUNTY REGIONAL
PLANNING COUNCIL

GOLDENDALE WA 98420

PARTICIPATING
AGENCIES:

BOARD OF
COUNTY COMMISSIONERS

CITY OF
BINGEN

DALLESPORT

GLENWOOD

CITY OF
GOLDENDALE

LYLE

TROUT LAKE

CITY OF
WHITE SALMON

PORT DISTRICT

September 6, 1973

Green Associates, Inc.
32 West Road
Towson, Md. 2124

Re: Dredged Spoil Study
Your Contract 8173

Dear Sirs:

In response to your letter concerning our plans and requirements for dredged spoils, I can only say that there has been little "official" consideration for the use of spoils in Klickitat County. However, the local Public Utility District and Port District have industrial development plans which may consider use of spoils. I have contacted these two agencies, as well as the Soil Conservation Districts, County Planning Commission, Shoreline Management Committee, Mid-Columbia Economic Development District, Department of Natural Resources, and the Columbia Gorge Commission and asked them to respond to your letter.

I have sent you under separate cover a number of reports and studies, that might be of interest to you.

I might mention that one local businessman has suggested pumping spoils from the mouth of the Klickitat River to natural depressions behind Columbia Gorge cliffs for agriculture and residential uses.

Much land along the Columbia River in our county is lava "scabland" with little soil. It may be possible to use dredged spoils to convert this useless land into industrial, agriculture, or residential sites.

I hope this information will be of help to you. Let me know if I can be of further assistance.

Very truly yours,

Dennis A. Olson
Planning Director

DAO:lh

MM

(14)

RECEIVED

SEP 10 1973

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

RR
EFD
RAM
ROB
UE

9

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
Bert L. Cole, Commissioner of Public Lands

DISPOSAL OF DREDGE SPOIL IN PUGET SOUND

1. The Situation

Deep water disposal has been used as a method of getting rid of unwanted dredge spoil for many years.

A reduction in available fill sites and, in fact, the near prohibition on filling has increased the need for alternative disposal methods.

There is an increasing concern on the part of regulatory agencies regarding the effect of spoil or any other material which is placed in the water.

Some improvement projects have not been carried out because no site was available for disposal of the resulting spoil.

As time goes on an increasing number of agencies are becoming concerned with spoil disposal practices and can through the Corps permit impose restrictions on the operator.

Regulation of deep water disposal is increasing but acceptable sites are loosely defined and not well coordinated between the various regulatory agencies.

Due to the poorly defined sites and lack of surveillance, dredge spoils have been deposited over wide areas, unauthorized materials have been dumped and unauthorized sites have been used.

The agencies regulating the disposal of spoil material do not have good information relative to what happens to the material when it is placed in the water or the ultimate effect it has on the bottom

2. Department of Natural Resources Spoil Disposal Program

A. Concept

When surplus spoil is available, an aggressive effort should be made to find a use for the material. The use of broken concrete for underwater reefs, excess spoil for the creation of artificial islands, and the limited filling of public land for public purposes will be considered.

In the event the spoil cannot be used constructively, and is approved for deep water disposal by all of the various regulatory agencies, it should be deposited on a site which has been agreed to by all agencies concerned.

Disposal of Dredge Spoil in Puget Sound (Cont'd)

Interagency agreement has been reached on a series of sites throughout Puget Sound as convenient as possible to the normal sources of spoil material.

A system of surveillance for these sites is being provided which will report unauthorized use of the sites or off-site dumping by authorized users.

B. Charges

A fee will be charged for depositing the spoil on the state-owned bed.

The fee is based on the value of the site for other purposes such as deep sea shellfish production, shrimp production, commercial trawling grounds, fishery food source, etc., and constitutes damages due to withdrawal of the area from the multiple use resource.

The Department of Natural Resources has provided maps of the spoil deposit sites to concerned agencies and determined for each site a set of references suited for use by the operator for locating himself on the site.

Upon payment of the appropriate fee, a lease will be issued to the operator for use of the site.

C. Use of Fees

Revenue derived from spoil dumping fees will be used to pay for the site surveillance program and for an interagency research effort designed to learn more about both the short and long term effects of dumping spoil in deep water.

We feel that having specific sites agreed to in advance by all regulatory agencies will expedite the granting of deep water disposal permits as well as reduce the damage from indiscriminate disposal while helping pay for the research needed to learn more about the effects of this activity.

D. Fisheries and Game Hydraulics Project approval and Army Corps of Engineers Permit must be obtained before dredging is begun.

6/17/71

RAB:mr

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
BERT L. COLE, COMMISSIONER OF PUBLIC LANDS
OLYMPIA, WASHINGTON

PROJECT DESCRIPTION

SMITH ISLAND SPOIL DISPOSAL MANAGEMENT SITE

The Department of Natural Resources is proposing to manage an 18 acre tract of State school land as a temporary flood plain management spoil disposal site in Lot 4, Lot 8 and Lot 11, Section 16, Township 29 North, Range 5 East, W.M. The proposed site lies just downstream from the I-5 bridge crossing the Snohomish River, and between the highway on the east of the site and the Smith Island County Road on the west of the site.

A portion of the proposed site is under lease to the Department as an inter-agency committee boat launching installation 67-701A, 67-702D - See area outlined in red on attached plat. The portion of the leased area currently developed and used for this purpose, lies west of the Smith Island Road. The portion of the leased area lying east of the road is not currently used in connection with the boat launch facility, and no funds are available for developing this area prior to 1977. The existing development is adequate to meet current needs, except that additional parking area is needed during peak use periods

Associated with the Federal navigation improvement project on the lower Snohomish River, the U. S. Army Corps of Engineers maintains a settling basin in the river just upstream of the I-5 bridge. The purpose of this settling basin is to intercept river sand, being carried downstream by the river, at the upstream end of the project, and thereby minimize costs and environmental impact of project maintenance.

If this material is not removed regularly, the subsequent river bed load of sand and silt will be carried into the navigation channel, reducing depths to less than those required for current commerce along Everett's waterfront industrial

properties.

An equally important effect of reduction of river depth due to siltation, would be to reduce the hydraulic capacity of the river channel, thereby increasing the frequency of flooding the industrial waterfront and boat launching facility.

Historically, the normal practice has been to dispose of spoil generated by such navigation projects on the lowlands along the course of the navigable river, thereby raising such lands above flood level and increasing the market value of the land as industrial property. All rivers deliver a continuous stream of sand and silt to such down river locations, unless the bed load is intercepted by a dam or similar structure immediately up river.

If this continual flow of material is deposited on the flood plain in the form of fills for land improvement purposes, the hydraulic capacity of the flood plain is directly reduced and the prospect of increasing frequency and severity of flooding other land is enhanced.

The purpose of the proposed action by the Department of Natural Resources is to provide an interim site from which the material will be removed from the flood plain. This will accomplish three purposes.

1. Preserve the utility of the Everett waterfront as a site for commerce, thereby avoiding further negative impact to the local economy and reducing the demand for commercial use of other Puget Sound shoreline. Dredging contracts must be let by June 15, 1973 or the funding will be lost and approximately 3 years will be required before refunded. By then, the project may have to be reconstructed due to excessive siltation. Funding for such reconstruction would be difficult to acquire.

2. Provide a three year period for local government to arrive at a permanent solution to this flood plain management problem.
3. Avoid loss to local economy during the next three years from decreased serviceability of the channel and increased rate of flooding due to reduced hydraulic capacity.

The general area proposed has been used as a disposal site on two past occasions. In 1967, 480,000 cubic yards was deposited on the site. During the next 3 years much of this material was removed in connection with state highway construction. In '970, 250,000 cubic yards was deposited on the site. The Department of Natural Resources is proposing an estimated 150,000 yards be removed in preparation for re-use of the site in connection with this years dredging.

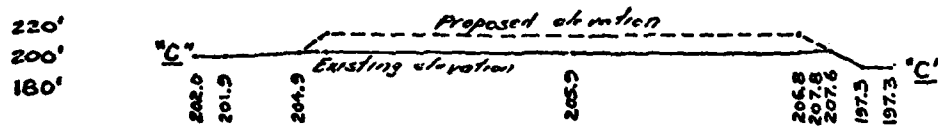
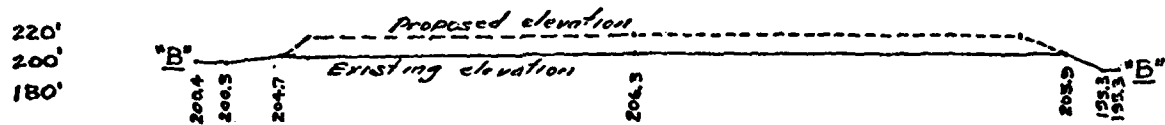
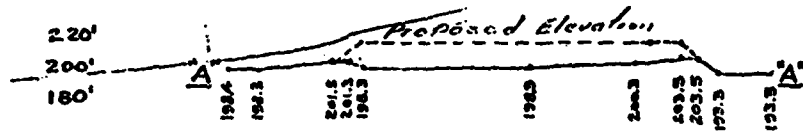
The land involved belongs to the common school trust and is managed by the Department of Natural Resources for the benefit of the common schools. A portion of the area is under interagency committee financed lease to the Department of Natural Resources for recreation purposes. The material removed from the river belongs to the State and is subject to disposal as provided by RCW 79.01.178.

Fees will be charged for the material as removed. Funds produced will be used to:

1. Pay the school trust for use of the land not under lease for recreation;
2. Reimburse Department of Natural Resources for diking and management costs and;
3. Support public use and recreation elements of the Department of Natural Resources marine land management program. (beach marking program)

RAB:nr
4-17-73

CROSS SECTIONS OF PIT SITE

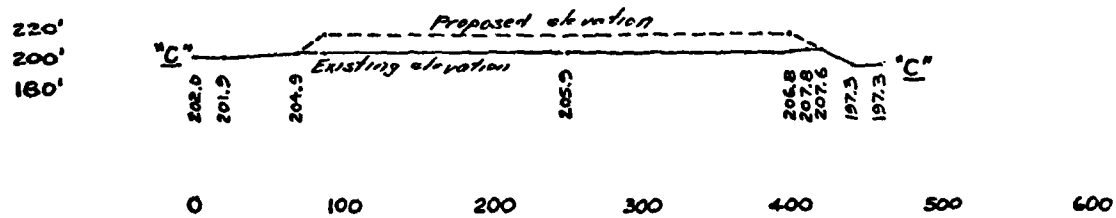
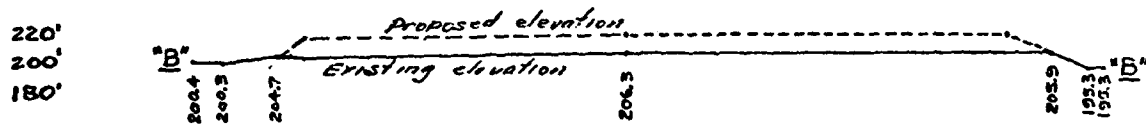


0 100 200 300 400 500 600

SCALE: 1" = 100'

----- Proposed level.

CROSS SECTIONS OF PIT SITE



SCALE: 1" = 100'

---- Proposed level.

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
BERT L. COLE, COMMISSIONER OF PUBLIC LANDS
OLYMPIA, WASHINGTON

MEMORANDUM OF AGREEMENT BETWEEN
DIVISION OF RECREATION AND
DIVISION OF SURVEYS AND MARINE LAND MANAGEMENT

In order to serve a current public need on the lower Snohomish River, it is proposed that we temporarily use a portion of the Smith Island boat launch recreation site lying east of the county road for deposit and subsequent removal of sand. This portion of the site is not currently used in connection with the boat launch.

The Division of Surveys and Marine Land Management will be responsible for the following.

1. Replace any vegetation damaged by the proposed activities in response to request by Recreation Division.
2. Confine removal operations to week days.
3. Confine all activity associated with deposit and removal of spoil to that portion of site lying east of county road.
4. Leave site in topographic condition suitable for use as parking area and according to a mutually agreed to plan, including plantings.
5. Plant trees on the dike around the site.
6. Provide material without charge for any needed improvement of the boat launch site west of the road.
7. Seed the site with grass following removal of material.
8. Provide a gravelled parking strip 20 feet wide by 1000 feet long, along the east side of the Smith Island road.
9. Prevent use of the developed recreation site by any contractor for any purpose associated with deposit or removal of materials.
10. Estimate deposit activities will be completed before September 30, 1973 and removals by June 30, 1977.
11. Provide ditch between base of dike, and proposed parking area between dike and road.

RAB:nr
4-17-73

MEMORANDUM OF AGREEMENT

Between State of Washington

Department of Natural Resources

and

The Inter Agency Committee for Outdoor Recreation (I.A.C.)

WHEREAS, the Department of Natural Resources has leased portions of Lot 4 and Lot 8, Section 16, Township 29 North, Range 5 East, W.M., from the School Trust for use as a public boat launch site on the Snohomish River.

WHEREAS, the above site has been acquired and developed with Inter Agency Committee funding (project 67-701A, 67-702D).

WHEREAS, the current development is in need of extensive repair due in part, to impacts from other users than the boating public, and partly due to design inadequacies.

WHEREAS, the exposure on the river at this particular site is not optimum for boat launching.

WHEREAS, a more desirable site exists immediately north of the existing site, and is also on school trust land.

WHEREAS, the Department of Natural Resources, as manager of the State-owned bed and shores of the Snohomish River, is responsible for disposition of the river sand periodically removed from the river by the Army Corps of Engineers for the purpose of maintaining river depth.

WHEREAS, an undeveloped portion of the above recreation site lies within a tract which is proposed for use for deposit of river sand.

WHEREAS, this sand deposit site is the only available area for placement of material scheduled for removal from the river this fall.

WHEREAS, funding for this Federal navigation maintenance project will be lost, if a disposal site is not available by June 7.

WHEREAS, the Department of Natural Resources is proposing to manage the disposal site in question, for repeated use in connection with the navigation project.

Now therefore, it is recognized and agreed that the public interest is best served by providing for a replacement boat launch facility on a nearby site, and utilizing an undeveloped portion of the existing site for dredge spoil management.

The parties signatory hereto agree as follows:

ARTICLE I

The Department of Natural Resources agrees to immediately arrange for an equivalent lease of school trust land for a replacement boat launch facility on the adjacent site (Tract A) to the north, (as described in attachment hereto), at no expense to the I.A.C. or the Bureau of Outdoor Recreation.

ARTICLE II

The Department of Natural Resources agrees to construct, prior to March 1, 1975, a new boat launch facility on the replacement site, which is equal to the current facility in all respects.

ARTICLE III

The Department of Natural Resources will provide for continuing use of the existing site (Tract C, as described in attachment hereto), until the new site is fully developed and accessible for public recreation use.

ARTICLE IV

In exchange for the above, the Inter Agency Committee approves surrender of the leasehold interest to the portion of the current lease, (Tract B, as described in attachment hereto), lying East of the Smith Island Road.

ARTICLE V

In further exchange, the Inter Agency Committee approves surrender of the remaining leasehold on the portion of the existing site, (Tract C, as described in attachment hereto), lying West of the Smith Island Road, at the time that the Department of Natural Resources completes development of the replacement facility.

IN WITNESS WHEREOF, the parties hereto have executed this agreement

Date _____

Bert L. Cole, Commissioner of Public Lands

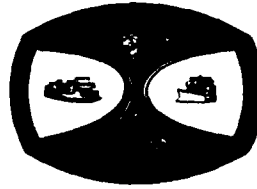
Date _____

Stanley E. Francis, Administrator
Interagency Committee for Outdoor Recreation

RAB:nr
5-10-73

WASHINGTON STATE
HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS

Highway Administration Building
Olympia, Washington 98504 (206) 753-6000



September 25, 1973

(12)

RECEIVED

SEP 27 1973

✓
Mr. Edwin F. Drabkowski
Project Manager
Green Associates, Inc.
32 West Road
Towson, Maryland 21204

GREEN ASSOCIATES, INC.
BALTIMORE, MD.

RE: CONTRACT 8173
DREDGED SPOIL STUDY

Dear Sir:

A review of your letter requesting information relative to dredging leads us to believe that another agency of our State Government might better answer your questions. We are, therefore, sending a copy of your letter to the Department of Commerce and Economic Development for reply.

We can add, however, that we have, on numerous occasions, contracted with the Corps of Engineers to stockpile suitable dredge sand for future use as highway embankment material. Depending on the area and the parent material, dredged material can be of excellent quality and suitable in every way for our use. We believe the local Corps people are aware of our needs in the few remaining areas adjacent to possible dredge sites. Where the material, as proven by test hole, is suitable, we of course will be glad to use it.

Yours very truly,

R. V. LE CLERC, P.E.
Materials Engineer

RVL:bjs
HESandahl

cc: Robert Anderson, Acting Director
Dept. of Commerce & Economic Development w/attach.

H. W. Humphres w/attach.

APPENDIX B

MEMORANDA OF CE DISTRICT

VISITS

GREEN ASSOCIATES, INC.

MEMORANDUM

To: File, R.R., V.E., J.H.S.
From: E. F. Drabkowski
Subject: Dredged Spoils - Visit to New Orleans
District - C of E

Date: September 10, 1973
Contract No: 8173

In the absence of Mr. Nettles, Assistant Chief of Operations, I met with Messers H. R. Schorr and H. R. Vick, both of whom are staff engineers in the Operations Division.

The following responses were given to our list of questions:

A. At present and in the foreseeable future, the New Orleans, Louisiana District is not actively seeking disposal sites for dredged spoils. The impression given was that the District has no current problems associated with their spoiling procedure which includes both confined and unconfined disposal on adjacent marsh lands and open water disposal adjacent to dredged channels in the Gulf Intercoastal Waterway (GIWW).

It was reported that the Environmental Protection Agency (EPA) gives little resistance to the District's disposal practices. Also, the local citizen groups accept these practices without much criticism. However, some expected limitations may be imposed on the present dyked confined spoiling areas along the Southwest Pass. Some discussion centered on the possibility of pumping the spoil onto barges for disposition at inland sites. The Corps representatives said that this is not possible at this time since they have no authorization for this practice.

B. There are no committed projects for purposes of beach nourishment or wildlife management.

Overboard disposal areas are interrupted at periodic intervals to permit cross-channel navigation by small fishing and pleasure craft in the area.

C. Commitments to create recreational land areas at Calcasieu Lake and various improvements made for access and boat launching in the Atchafalaya Basin.

Confined disposal sites are hampered by the problem of subsidence. Adjacent marsh-land sites have unstable foundations which cannot support heavy loads such as would result from confined spoiling.

D. Dredge quality varies according to the location of the dredge. The material is mostly silt and clay with some sand in the Gulf Intercoastal Waterway (GIWW) and the Bayou LaFourche.

E. The City of New Orleans has inquired about the use of dredged spoils for use in building up the land base for a "new town - in town" concept entitled Pontchartrain which is situated between Lake Pontchartrain, the Intercoastal Waterway extension of the Mississippi River Gulf Outlet, and Lake Borgne.

To: File, R.R., V.E., J.H.S.

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September 10, 1973

Also, a new concept entitled "Centro-Port" is being pursued by the Port of New Orleans which is a relocation of the major port facilities to a site along the Mississippi River Gulf Outlet (MRGO). Industrial use is proposed for development along the banks of the MRGO. Dredged material will be the source of this adjacent land area.

F. Some sand is taken from the Mississippi River by private contractors who market the material. The Corps does not seek this outlet as a means of disposal.

G. No real research studies being pursued. Little current thinking has been done on long range planning. Short-range solutions are proposed at each project development.

H. Environmental Impact Statements concerning the Michoud Canal - Mississippi River Gulf Outlet and the Bayou Bodcou were received.

J. The Corps follows the regulations imposed by the Louisiana Stream Control Commission which is backed by the EPA.

K. Other agencies involved in port development activities include:

1. The Port of New Orleans - Board of Commissioners
International Trade Mart Building
2. Regional Planning Commission
3. New Orleans Chamber of Commerce
4. City Planning Commission

L. Reports Received: Environmental Impact Statements, Maps of dredging operations, and the 1973 copy of Water Resources Development in Louisiana.

GREEN ASSOCIATES, INC.

MEMORANDUM

To: File, R.R., V.E., J.H.S.

Date: September 20, 1973

From: E. F. Drabkowski

Contract No: 8173

Subject: Dredged Spoils - Mobile District,
Corps of Engineers

Discussion held with Mr. A. Forest Pruett, P.E., Assistant Chief of Operations, and Mr. Don Conlon, P.E., Environment Section, Corps of Engineers District Office, Mobile, Alabama.

- A. There is concern in this District as to the future methods of spoil disposal; however, they are not seeking landfill disposal sites unless they are incidental to the area being dredged.

The District has sponsored a special study to determine alternate dredging and spoil disposal techniques, and they also have an outline plan to dispose spoils into diked areas on Blakeley and Pinto Islands in the Mobile Bay area. The special study has no official acceptance and the diked area plan on the islands has been attacked by the EPA as being hazardous to minor fish organisms.

Present policy seems to be directed toward providing immediate solution to current problems. This policy stresses to resolve EPA and environmental agency criticisms. No real alternatives are, or have been, proposed.

- B. The quality of material dredged in the Mobile District service area east of the Perdido Pass along the Florida coastline is such that it is suitable and used for beach nourishment. A principal location has been at Panama City, Florida. Where suitable material is available it is generally pumped onto the beaches.
- C. Port St. Joe, Florida was essentially created by dredged material deposits. Other areas along Mobile River now developed in industrial use were built-up from dredged material. However, the District office claims that their "hands are tied" to official policy which does not permit flexibility in deciding on providing landfill. When requests for disposition of spoils on private lands were made, the Corps used to investigate the areas and determine suitability and then consult with the environmentalists. Because of the extra efforts, etc., the Corps no longer honors private requests.
- D. Most coastal projects consist entirely of sand. Predominant sand dredge is obtained from Perdido Pass easterly along the Florida coastline. Also, the inland rivers above the tidal area consist mostly of sand and gravel deposits. Particular reference is made to the Tombigbee and Pearl Rivers.

From Mobile Harbor to the west, the material is mostly fine silt.

Memo To: File
Page 2
September 20, 1973

The Mobile Corps office has adopted the local position not to pursue sales of marketable sands and gravels. They claim that too many legal constraints and the fact that they own only small amounts of land with no support facilities prevents them from this course of action.

However, some 2 to 3 million cu. yds. per year of sand and gravel are extracted in this area. Most of the material is dredged and obtained by Radcliff Materials, the biggest sand and gravel operator in the area.

Mr. Carl Tolbert, V.P.
Radcliff Materials, Inc.
McDuffie Island, Alabama (432-2651 phone)

E. The Corps local policy is not to support requests for their dredged material.

F. Sand and gravel (2-3 million cu. yds./yr.)

It costs the local Corps from \$0.10 to \$0.25 per cu. yd. to dredge spoils from coastal projects. In the inland waterways, the costs range from \$0.30 - \$0.40 per cu. yd.

G. In general, long range planning by this District has been nil. Three studies are available:

1. Environmental Investigations of Dredging Activities in Mobile Bay, Alabama
2. Environmental Effects of Hydraulic Dredging in Estuaries
3. Alternative Dredging and Spoil Disposal techniques, Mobile Harbor, Alabama

H. Local and regional planning agency activity has concern about the dredge disposal problems in this area. Plans, documents and maps have been obtained and are in our files.

J. EPA and local agency constraints are strong. The District's evaluation of each state area in terms of environmental pressure are as follows:

1. Florida - most strongest
2. Louisiana - next strongest
3. Mississippi - Next least
4. Alabama - least

EFD/cc

GREEN ASSOCIATES, INC.

MEMORANDUM

To: File, Copy to RR, VE, ED

Date: November 13, 1973

From: Tom Watchinsky

Contract No: 8173

Subject: Dredged Spoil Study
Baltimore District

I visited the Baltimore District Office of the Corps on November 12 and spoke with the following individuals:

1. Mr. H. Epstein, Chief of Navigation Branch
2. Mr. J.G. Gerchalk, Permits Section
3. Mr. Kenneth Beale, Environmental Branch

In addition to the proposed Hart-Miller Island project, several other Corps disposal projects were discussed by Mr. Epstein. The Corps is planning to dredge the channel of Slaughter Creek at Taylors' Island for a small boat harbor. The material from this project is sandy and not polluted and will be pumped against the shore of Taylor's Island to create a marsh for wildlife. The amount of material involved is about 40,000 cubic yards and will create a marsh of about 10 acres. This project is currently being advertised and an announcement and environmental evaluation have been prepared. These will be mailed to us as soon as possible. It was Mr. Epstein's opinion that if the Slaughter Creek project is successful, it will be used for larger scale projects where serious environmental questions do not occur. Mr. Epstein did not feel that this type of disposal would ever obviate the need for a diked disposal area for Baltimore Harbor dredging.

Another current use of dredgings is as beach nourishment at Ocean City with sand dredged from Ocean City Inlet. The Corps is also planning on-land disposal of dredgings from the Nanticoke River. This river is being dredged to improve the channel to a commercial fishing harbor. The dredged material, about 25,000 cubic yards of unpolluted sand and silt, will be used for landfill material at a site near Bivalve, Maryland.

Another project in the preliminary planning stage is a dredged fill at Diked Marsh on the Potomac River about halfway between Alexandria and Mt. Vernon. Part of this area was used in a quarrying operation and it is the desire of the U.S. Park Service to reclaim the excavated areas with dredged fill from the Potomac.

Also discussed at our meeting were several past landfill projects in the Baltimore District. Mr. Gerchalk mentioned the fact that Bethlehem Steel Co. has filled some 500 acres at their Sparrows Point plant since 1947. He also recalled a project about 10 years ago where the Corps constructed some small islands in Sinepuxent Bay from channel dredgings for the creation of wildlife habitat. Also discussed was the fact that the Maryland Port Administration has been filling with dredged material at Hawkins Point and Dundalk Marine Terminal for the past 20 years. Mr. Gerchalk suggested we contact Mr. Willett of the Maryland Port Administration for more detailed information on that organization's projects. Mr. Gerchalk also believes that part of the site of Washington National Airport was created with dredged material.

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Several times in the past the Baltimore District Office has been approached by private individuals seeking fill material. These requests have always been refused due to access and transportation problems and, in some cases, suspected opposition by environmental groups. The Corps' criteria for releasing dredged fill are that there be no serious transportation or access problems to the fill site and no serious complaints about use of the site.

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GREEN ASSOCIATES, INC.

MEMORANDUM

To: File, R.R., V.E., J.H.S.
From: E. F. Drabkowski
Subject: Dredged Spoils -
Philadelphia District, C. of E.

Date: September 6, 1973
Contract No: #8173

Discussion held with Mr. Harold Griffiths of the Operations Division, Corps Engineers, Philadelphia District Office.

- A. The primary disposal method used in the Philadelphia District is landfill. Most of the dredging operations are concentrated in the Delaware River with disposal sites located on adjacent banks. Spoils are pumped onto the disposal site from Hopper dredges with pump out capability.

Beginning in the latter part of 1972, the Philadelphia District has been selling their spoil material to area contractors and municipalities. The sales are by bid invitation made thru the Real Estate Division as U.S. Government property. Advertisement of the availability of the dredged material for sale is by area newspaper, t.v. and direct letter notification. An example copy of a bid invitation is in our record file.

The success of this sales program is evidenced by the fact that \$340,350.00 worth of fill material was sold since the first contract award was made in November 1, 1972. A copy of this sales record is in our file.

- B. Beach nourishment, wildlife management and marshland development by the use of dredged material is negligible. Beach nourishment is performed by authorization through regular channels; however, the demand is reported to be minimal. The Corps has agreements with the State Fish and Wildlife Commission regarding grass planting and maintenance; these practices only have general application.
- C. All confined disposal sites are located solely for the purpose of spoil disposal. No sites are estimated for another land use at this time.
- D. No specific analysis is made of the spoil quality. It is generally classified as silt, sand, clay and gravel.
- E. The practice of selling dredge material satisfies the requests for utilization of this material. Most uses are scheduled for general fill, sanitary landfill cover material and, where quality is high it is used in highway construction.
- F. Experiments were made at Rutgers University, to mix dredged spoils with New Jersey sand to make a viable agricultural soil. The results thus far are reported to be inconclusive. A copy of the report on this experiment is yet to be obtained.

The Franklin Institute has made a study to product ceramic building material with dredged spoil as the source. At present, costs exceed benefits.

A copy of a report on this study is in our file.

Other viable uses have been made of the dredged material from the Delaware River where the quality is known. Fair quality sand is predominantly available north of Philadelphia to Trenton, New Jersey the State of New Jersey controls much of this material for its' use.

- G. Research has been made as referenced in Paragraph (F) above. A detailed study on the disposition of dredged spoil was made in 1969 by the District Office. This comprehensive study consists of (7) volumes and is available in our file.

- H. Environmental Impact statements are currently being prepared on the New Jersey Intercoastal Waterway (by Rutgers University) and the Delaware and its tributaries (by A. E. Little and Company).

Example dredge map locations, maintenance dredging specifications, building materials experiment report and a study on use of Hopper Dredges for Beach Nourishment are available in our files.

- I. The EPA monitors the activities in this District. Their approval is required prior to any spoil operations on "new" marshlands, for private dredging leases, testing of effluents from spoil disposal sites. Most operations are on existing disposal sites and are "exempt" from environmental impact statements.

FILE COPY

M E M O R A N D U M

To: File & RR, ED, JHS

Date: Sept 13, 1973

From: Victor Elias

Contract No: 8173

Subject: Dredge Spoil Study
Visit to Norfolk District Office
of Corps of Engineers

Visited with Mr. Lawless, Chief of Navigation Branch which, in this District, is essentially charged with the responsibility of overseeing dredging projects, both maintenance and new work.

The approximate volume of dredging in this District has remained fairly constant over the last few years, in terms of maintenance dredging and averages about 5 million yards/year. The Corps, with its hopper dredging, chiefly the "Goethals", which has pumpout capabilities, maintains the main shipping channels to Baltimore & in to the Newport News-Norfolk-Portsmouth complex and its associated anchorage areas. The balance of the maintenance dredging on the James River to Richmond, the Intercoastal Waterways and other smaller projects are handled by Contractors utilizing pipe line dredges.

At present, the following disposition of spoil is being made:

1. The Corps hopper dredges maintaining the shipping channels to Baltimore & Norfolk-Newport News are dumping the spoil in the Atlantic Ocean approximately 40 miles out. This material is a mixture of fine sand, silt & shells and at certain shoals, is predominately fine sand. This disposal method has not yet been attacked by EPA or environmental groups and is considered successful and even beneficial as it is creating a clam habitat in an area previously nonproductive because of bottom conditions made primarily of silt and clay. In addition, this overboard ocean dumping ground is at the confluence of various strong currents and tends to place the dredged material in the literal drift system and therefore provides some degree of beach nourishment to the Virginia beaches. Some of this work is apparently being documented by VIMS for the Corps & Fish & Wildlife interests.

In addition, a multiple utilization scheme for disposition of these predominately sandy dredged materials is being studied for implementation & will consist of utilization as a beach nourishment source for Virginia Beach under a presently authorized project. Additional funding and changed Congressional Authorization could extend this multiple utilization scheme for greater consumption of dredged material and additional nourishment for beaches further down coast.

2. Corps hopper dredges with pumpout capability & contractors pipeline dredges maintain the anchorages and channels to the Port of Newport News-Hampton Roads-Norfolk with the dredged material being deposited at the Craney Island Disposal Site. It is anticipated that the disposal site has sufficient capacity until 1978, with its present elevation & could conceivably be stretched out for 20 to 25 additional years if the design elevation is raised to approximately 25 from its present authorized 18. Due to the success of Craney Island, studies are being completed for an alternate or additional disposal area, most likely at an upland site to be then redeveloped as a

park or other recreational use. It is conceived that this additional site be fed from Craney Island, which would act as a rehandling or stock piling area for further pipeline transport, to this additional disposal site. Some attempt at utilizing the dredged material at Craney Island has been made with limited success, since sand fill is generally available in the area at locations with better transportation and handling facilities than those serving or existing at Craney Island.

Possible users of large quantities of fill are the Virginia Highway Dept. in conjunction with major roads in the vicinity and Newport News Shipbuilding Co. in conjunction with major development at the Shipyard. It is interesting to note that the Shipyard development needs will be served by the Craney Island fill only if they are not able to secure a dredging permit for good quality sand existing in the open water just beyond the planned complex and outside the maintained shipping channels. This office is very anxious to promote the use of the Craney Island fill as it would lengthen the life of the facility and has in the past made accommodations to potential users. However, it has not yet gone in the business of trying to actively sell the dredged material contained.

3. Contractors pipeline dredges maintain the James River from Richmond to Hopewell. In this area, the local interest supply the disposal site and in so much that the user dredging consists of sand and gravel, the city of Richmond stockpiles the material as a fill source which they later use or sell. Further down river, numerous worked out sand and gravel pits exist and Lone Star Industries, the major sand and gravel producer of the area, generally makes disposal sites available, where he later processes the dredged material as a sand and gravel resource. Below Hopewell, the topography & geology changes with the dredging not as rich in sand and gravel and a lack of disposal sites near the river. Here the method of disposal is presently overboard and is probably the most vulnerable of all of this Districts disposal practices. On a preliminary basis the District here could be convinced to possibly discontinue this overboard practice and concentrate on building marsh areas instead. The waters at this point are brackish and similar to Chesapeake Bay and would certainly lend themselves to this development. The District has recognized this and is studying marsh building as a possible viable alternate to overboard disposal. The situation on the Intercoastal Waterways is substantially similar to the lower James River area and is viewed with the same concern except that the volumes of dredging involved are smaller.

In conclusion, this District feels that it has, at least for the moment, the situation in hand with its mixed and flexible policy of disposal, and is vulnerable in only a number of limited projects. The best opportunities for multiple utilization, in addition to the existing disposal site, appear to lie in the creation of new marshes along the lower James River and the Intercoastal Waterways, the utilization and promotion for beach nourishment purposes of greater quantities of the hopper dredgings from the approach channels, which might be suitable and active promotion of the use of the existing spoil at Craney Island for landfill or aggregate, which would extend the life of this facility in the containment of the polluted spoil from the harbor areas.

GREEN ASSOCIATES, INC

MEMORANDUM

To: File Date: November 14, 1973

From: E.F. Drabkowski Contract No: 8173

Subject: Dredged Spoil Study Information
Detroit District,
U.S. Army Corps of Engineers

I met with Mr. U.W. Boresch, Chief, Operations Branch, Detroit District, USACE. Also, I talked with Mrs. Mary Ann Cooper, PhD., an environmentalist with the District.

Mr. Boresch indicated that since P.L. 91-611 of 1970, no recent work on maintenance projects identified as being polluted were worked. These project areas are mainly confined to harbor basins and ship channels. Other project areas not specified as polluted by the EPA are worked on a regular basis and generally dumped in open water or used for beach nourishment when suitable. Project areas considered polluted can only be disposed of in dike-contained locations. The ship channels south of the Detroit River in Lake Erie are classified as polluted and will not be dredged until suitable disposal sites are found. The Toledo Harbor receives regular attention from the Corps. Present contained disposal sites are filled or meeting filled capacity. A public notice identifying a new location for a large confined site in the Toledo Harbor was released in September 1972. This site is now being revised. At least 3 other sites have been acquired since 1963 in the Toledo Harbor area.

The quality of the material dredged from maintenance projects is mainly fine silts and clays plus some domestic and industrial wastes in the ship channels and harbor basins. Other maintenance projects are mostly sands and gravels which are usually dumped in deep waters or pumped on shore areas. The Saginaw Bay area has some quantities of good quality sand which is stockpiled by the City of Saginaw in a confined site. As this material is used and extracted from the site, the Corps replenishes the supply.

Requests for dredged spoils as landfills are received by the District. However, most are small scale requests and are ignored by the Corps. As mentioned above, Saginaw uses dredged sand as a resource material for city projects. Requests by the Consumers Power Company in the Saginaw area for fill to construct a large nuclear power plant lost company support and was dropped.

Mr. Boresch pointed out that private agencies requesting fill must provide the site and pay the costs for constructing dikes, etc. prior to the Corps' disposal. Also, concern as to the profit return by private agencies on lands created from spoils is questioned by the Corps. Requests for dredged material from public agencies, if approved, are generally paid for by the Federal Government.

GREEN ASSOCIATES, INC

MEMORANDUM

To:

Date:

From:

Contract No:

Subject:

Page (2)

A fairly large disposal site in the Toledo Harbor area is now nearing capacity. When closed by the Corps it will be turned over to the City who is considering building a park on the site. An alternative proposal is an airfield for light planes.

Mr. Boresch stated that P.L. 91-611 requires long range plans for disposal of spoils beyond 10 years. Current site selections are based on ten-year life spans. He thought that our study will suggest alternatives for disposal for the 10-year and over period.

The young Port of Monroe north of Toledo is formulating plans for future expansion; feasibility studies are now being prepared. A potential for great quantities of fill exists for bot inner and outer port expansion. Public acceptance is being sought.

A regional park agency known as the Huron-Clinton Metropolitan Authority has requested the use of spoil material for park development. However, nothing specific has yet been accomplished.

Dr. Mary Ann Cooper, a biologist with the Corps is currently investigating spoil disposal problems including upland disposal. She feels that the real issues surrounding upland disposal are quality, economics and transportation. Where to "dump" spoils and multiple use potential of spoil fills are already known, she says.

Dr. Cooper referred to a serious study headed by Dr. Raymond J. Krizek of Northwestern University, Evanston, Illinois on spoil disposal problems, etc.

Other persons to contact were identified as follows:

Mr. Max McCray, Director, Monroe Port Authority

Mr. Don Fletcher and Mr. Russ Veogtland
Toledo-Lucas County (Ohio) Port Authority

Mr. James McGowan, Bay County Port Authority (Saginow, Michigan)

Copies of Environmental Impact Statements and a Study of Shoreline erosion and land use around the Great Lakes were obtained. A 5-volume study on the National Shoreline Study published in 1973 should be obtained. I have Volumes I and IV.

GREEN ASSOCIATES, INC.

MEMORANDUM

To: File, Copy to RR, VE, ED

Date: November 5, 1973

From: Tom Watchinsky

Contract No: 8173

Subject: Dredged Spoil Study
Buffalo District

I spent November 1st and 2nd in the Buffalo, N.Y. area interviewing individuals concerned with spoil disposal and development in the area. The following is a list of individuals that I spoke with:

1. Mr. John McKee, Ass't. Chief of Operations, Buffalo District, USACE.
2. Mr. Joseph A. Foley, in charge of diked spoil area design and public contact for Buffalo District, USACE.
3. Mr. Stuart Alexander, Ass't. Director of Planning, Community Development Dept. , City of Buffalo.
4. Mr. James Jordan, Buffalo Chamber of Commerce.
5. Mr. David Seigneur, Deputy Director, Erie and Niagara County Regional Planning Board.
6. Mr. Matthew Carroll, Marine Division Manager, Niagara Frontier Transportation Authority.

Mr. McKee outlined the Corps' past experience in spoil disposal which includes diked disposal areas in Cleveland and Buffalo Harbors. There are 2 existing confined disposal areas in Buffalo Harbor and 1 in Cleveland Harbor. The new area in Cleveland Harbor is already slated for extension of airport facilities. Both Buffalo Harbor diked areas are still in use. The experimental diked area adjacent to the small boat harbor will only require one more year to fill. This land belongs to the local Port Authority which is exploring the possibilities of erecting a hotel. Mr. McKee indicated that all of the diked areas the Corps has been involved with have taken more fill than was estimated due to consolidation during filling.

The other dike in Buffalo Harbor is known as "Times Beach" and will take several more years of maintenance dredging to fill. This area is owned by the City of Buffalo and will become a park. The City of Buffalo is also planning to fill 40 to 50 acres of lowlands in the Lehigh Valley Basin just north of the experimental disposal dike. The intended use of this area is as a wildlife refuge. There is one proposed future Harbor filling project which has not yet been approved. This proposal is to fill the area between the end of Stony Pt. Breakwater and the shore at the Lackawanna Canal as a park development. All of these development areas are shown on the map of Buffalo Harbor which I obtained from the Port Authority as are the 250 acres of land already filled by the Port Authority just NW of the Harbor Heliport. This area is currently used for stockpiling bulk materials, but the Authority hopes to eventually attract light industry to the area. This view is

also shared by the local chamber of Commerce. These sources felt that if additional areas were made available by filling, that industry would find them attractive.

Diked areas are also planned for other cities in the Buffalo District. Bids will be taken in a few months for a diked disposal area to be constructed against the existing breakwater in Huron Harbor. This area will be a semicircular development 2200 ft. in radius and, in keeping with Ohio law that all such filled marine areas must remain in public ownership, will become a park area after 10 years of filling. I saw a rendering of the proposed recreational facility for this site and it is quite similar to that proposed for Hart-Miller Islands.

Additional confined disposal areas for Cleveland, Fairport, Ashtabula, and Sandusky are located and described in project announcements that I picked up. No specific use has been planned for these areas other than that they must remain public. Dredged material from all ports in this district is very fine silt with the exception of Sandusky Harbor where an appreciable amount of coarse grained material occurs. Private interests have approached the Corps in the past seeking fill material but have generally been disappointed by the quality of material available. The Corps has also sponsored some research into using spoil as agricultural and topsoil material. Agricultural uses have been disappointing since it was not determined what effect the pollutants have on crops, but the material was found to be suitable for park landscaping. To what extent future use can be made in this application is not known. These experiments were conducted by the Sierra Club. Apparently no attempts have been made in this area to produce manufactured products from spoil, probably because there is no lack of other material for these purposes.. Dredged spoil as fill will also have to compete with excavated material from the proposed Buffalo rapid transit system. All attempts at filling swampy inland areas have met strong resistance from conservationists and local townspeople. Some small beach nourishment projects have been undertaken by the Corps, particularly at Vermillion, Ohio, but these projects have not been too successful.

All of the spoil disposal areas in this district have been located for necessity and convenience of dredging disposal. None were established with a definite idea of filling for a specific purpose. I visited the experimental disposal dike in Buffalo Harbor which is nearly filled. This area is now filled to the level of the adjacent road and contains a tremendous growth of weeds 4 to 5 feet high. The land area appears no different than the surrounding terrain and no odors are present. Large signs are posted all around the area warning the public that the fill is not capable of supporting human beings.

Additional proposed projects in the area are a 70 acre recreational area on dredged fill at Conneaut and an extension of Gordon Park in the Bratenahl area of Cleveland. Oswego and Rochester, N.Y. are experiencing great difficulties with environmentalists in finding suitable areas for spoil disposal. Most of this opposition comes from private, local groups, since the EPA is willing to go along with almost any confined area in preference to open dumping which is still taking place in the smaller parts. Another difficulty expressed by the Corps personnel was their feeling that they cannot develop filled areas for the financial benefit of private interests without suffering public criticism. This reason together with financial difficulties caused the collapse of the proposed joint disposal area for the Crops and Bethlehem Steel at Lackawanna.

I obtained a copy of the future land use plan of the Erie and Niagara County Regional Planning Board which may be compared to the existing plan to locate possible fill areas. This organization had previously answered our questions by letter. The planning board has resolved to develop a general solid waste disposal scheme but does not wish to get too involved in dredged disposal activities.

The most pressing need expressed in this area is for additional land in the Buffalo Harbor area for recreational development by the City of Buffalo.

GREEN ASSOCIATES, INC.

MEMORANDUM

To: Victor Elias

Date: November 21, 1973

From: Dave Hoover

Contract No: 8173 7.6

Subject: Dredged Spoil Study
Seattle, Washington

Agencies Contacted:

1. Corps of Engineers - Bill Alguard - Don Thuring
2. Port Authority - Mr. M.E. Peyser
3. King's County Land Use Management Div. - Mr. Charles Fulmer
4. City Planning - Mr. Robert Hintz
5. Commerce and Economic Development
6. Economic Development Administration
7. Central Puget Sound Economic Development - Mr. J. Skott
8. Puget Sound Governmental Conference - Mr. Dwight Leffingwell
9. King's County Environmental and Community Development - Mr. Gilbert Stanford

With the exception of two of the agencies listed above all were very aware of the problems involved in the disposal of dredged material and all were eager to offer any assistance they could.

Traditionally, much of Seattle and areas surrounding the harbor have been filled by harbor dredging and also other fill material. This filling has been very extensive even to the point where they sluiced down material from the surrounding hills to fill areas. Much of this filling has been stopped either due to lack of need or because of EPA or the new Shorelines Management Act.

Presently the Corps of Engineers performs its maintenance dredging more or less when asked to do so. It is the present practice for the party requiring the area to be dredged also provide a disposal site, primarily the Port Authority. Some of the dredging has been used for Urban Renewal in Duwamish and road embankment where materials and timing of projects permitted. It has also been used to raise low lands and make productive areas. They have also deposited dredged material on Seattle City Light property for stockpiling. There is an agreement between a local contractor and Seattle City Light where he is selling this material for fill. All of this material has to be removed within 2 years. The Corps is presently thinking of trying this on a permanent basis at this site.

Now all designated disposal sites require an Environmental Impact Statement prior to filling. They must also comply with the New Shorelines Management Act of 1973. This applies to any disposal site within 200 yds. of any water way over the entire state. These two stringent controls over harbor disposition have actually caused several projects to be stopped. Along with EPA and Shorelines Management Act, they must also comply with Dept. of Natural Resources in regard to rookeries and fisheries. When the Corps has disposal along fishery areas, they cannot use vertical bulkheads but must use rip rap or some other method which gives a natural appearance.

The Corps also has eight open water disposal sites which may be used for disposition. Open water sites generally require exhaustive studies prior to selection of location and also require a relatively good quality and clean material. The sites are not actually marked but barges use coordinates or land points to mark sites. The applicants depositing in these sites are charged a state royalty and also are fined \$50, a cubic yard for spoil dropped outside of specific area. Open water sites are generally used last by Corps due to increased cost of transportation.

The Corps is also studying the possibility of having three or four regional sites for disposal on a long term basis. These sites could accomodate several dredging operations at the same time. They would also require higher costs for transportation and exhaustive studies to select such locations.

After talking with the other agencies, I compiled the list of possible fill areas on an accompanying page. I also was able to get a regional land use map from the Puget Sound Governmental Conference which covers the four counties that surround Seattle and Tacoma. The City Planning Commission contributed a Comprehensive Plan for the City of Seattle.

The only unique suggestion came from Charles Fulmer of King's County Land use Management. He suggested that the dredging and possibly solid waste be transported to eastern Washington possibly 100 miles inland to reclaim lava "scab" land for agricultural purposes. This area has a longer growing season and could handle square miles of material. He said he realizes costs would be exorbitant but with agricultural land disappearing to other uses in the future this could be very valuable property.

Possible Sites Requiring Fill in Seattle, Everitt Area

1. Jetty Island - Long term - Recreational complex
2. Simpson Lee Timber Co. - Possible recreational or industrial
3. Indian reservations
4. Waterfront of Everitt
5. Tacoma - Fife Industrial Site
6. Standard Oil Site
7. Noah Park Fill Req'd
8. Green River Valley requires preload fill if developed
9. Padilla Bay
10. "Sand Point - If recreational would fill for hills-Naval Air Force Base" -
If industrial fill for dock sites
11. Areas of Seattle Tacoma Airport
12. Piers 20-21 - Create 30 Ae. 1.2 mill ao. yds.
13. Piers 42-46 - Create industrial area - 4.2 mill ai. yds.
14. South Center Area - Residential latter industrial
15. Fill in area of West Marginal Way - Industrial
16. City property between pier sites - Recreation
17. Kellogg Island - Industrial
18. Chiyoda Chemical and Engineering - Industrial
19. Kaiser Cement - Industrial
20. City Light - Presently stockpile being resold for fill possibly permanent
resaleable stockpile
21. Desimone Estate - Potential stockpile for resale
22. Charles Fulmer suggested transporting fill inland to reclaim lava "scab"
land for agricultural uses. This would be in Eastern Washington, possibly
100 miles inland where there is a longer growing season.

GREEN ASSOCIATES, INC.

MEMORANDUM

To: VIC ELIAS

Date: 11/21/73

From: DAVE HOOVER

Contract No: 8173

Subject: DREDGED SPOIL STUDY
PORTLAND, OREGON

Agencies Contacted:

1. Corps of Engineers - Charles Galloway
2. Port of Portland - Robert Dalaski
3. Chamber of Commerce Economic & Area Development Division - David Eagon
4. City of Portland District Planning
5. City of Portland Comprehensive Planning - John McCormick

In general, all of the above departments visited were aware to some degree of problems pertaining to disposition of dredged harbor material. They weren't quite as aware of the problem as the groups visited in Seattle. This could be due to the fact that the dredging problem in the port-land area is not as complex or as involved as the Seattle area. The following comments were either from all or some of the above.

The Portland Area dredging by the Corps of Engineers should be divided into two categories. The first would be dredgings from the Columbia River.

The Columbia River dredge material is primarily a very fine sand. It is not polluted and around Portland is taken from fresh water as opposed to salt water dredgings of the coast. This material can be used anywhere as a good clean fill. In low lying areas along the river where fill is required, it is often dredged directly from the river and placed in the fill site. The Port of Portland is presently dredging strictly for fill material. Other parties may apply for this dredged material through the Corps of Engineers. There are presently no fees involved in these transactions. The Corps will deposit the dredge in a convenient location and it is up to the applicant to remove same.

The Corps meets twice a year with all interested departments in regard to the selection and availability of disposal sites. From these meetings they will determine where disposition will be most beneficial. In regard to receiving dredged material, the Corps gives Federal applicants first priority followed by state, local, county, industry and private interests in that order. It is a state law that the Corps of Engineers can deposit material anywhere along the rivers up to the high water line without permits. Along the Washington shore, however, they are subject to the Conditions of the Washington Shorelines Management Act. Oregon is presently organizing to develop its own Shoreline Management Act which will probably effect the Corps in the not too distant future. The Corps seems to be trying extremely hard to let parties interested know when and where the Corps will be dredging. The Columbia River dredged is a resource.

In the Columbia River and other estuaries where the dredge material is primarily sand, the Corps is studying other methods of dealing with the material. Where "sand waves" develop on the bottom of the rivers, high and low areas, the Corps is studying methods of skimming off the peaks and filling in the valleys. By doing this they are keeping the material in the river system, lowering the overall costs by not actually removing but, merely relocating the sand, and prolonging the actual need for dredging. Another favorable aspect of this is the fact when it finally becomes necessary to actually remove the material it will be better acclimated to a pumping operation instead of bucket dredging since it will have a more constant depth.

The second category of dredged material is that which comes from the Willamette River. This material is a polluted material and primarily silty in nature. This dredged material is where problems of disposal will arise. They are looking into several disposal sites for this material. The upper end of Swan Lake, stagnant area created by filling from shore to Swan Island-Ross Island, presently an island which is privately owned and is being mined for gravel, and also inland as sanitary land fill or other fill in the Rivergate project. The Ross Island area would be a long term project and would accomodate large quantities of dredge. The present owner would like to remove the entire island as gravel, but the state is afraid that loss of wetlands and also the altering of flow would have detrimental effects of the environment. They have made an agreement with the owner that he must replace an equal amount to that which he has removed each year. This would be replaced with dredged material. The island is presently a horse-shoe shape about 1½ mile long.

Areas where disposal has resulted in beneficial effects on the environment would be creating islands as rookeries, renourishing beaches to create fishing areas and as an erosion preventive to protect certain areas.

The only large area of new development is the Rivergate Area. It is on a peninsula between the Columbia and Willamette Rivers. Approximately 5 thousand acres is to be redeveloped and raised above flood line. It will require about 20 million more cubic yards of fill. Another area in the Rivergate plan where fill could be used would be in sanitary land fill cover.

I did acquire a comprehensive plan for the City of Portland, one for Rivergate and some other studies pertaining to the area.

GREEN ASSOCIATES, INC.

MEMORANDUM

To: Vic Elias, Ed Drabkowski

Date: November 29, 1973

From: Dave Hoover

Contract No: 8173 7/e

Subject: Dredged Harbor Study
San Francisco

-
1. Corps of Engineers - John Gustar
 2. San Francisco Bay Conservation & Development Commission - Tom Tobin
 3. City Planning Commission - Calvin Malone, Robert DeVelbiss
 4. Port of San Francisco - J. Van de Erve, Mr. Peleaux
 5. Associated Bay Area Governments - Yvonne Sanjule, Vivian Brown
 6. California Coastal Zone Conservation Commission - Jack Schoop

All of the agencies contacted above were aware of the availability of dredged harbor material, however none were very agreeable to the idea of using it for fill. Most were very concerned with the pollutants contained in the dredge material and felt that this would inhibit most uses.

Traditionally much of the San Francisco area has been built on fill along the coast. New lands have been created and also large areas of wetlands have been filled and developed. This trend has been stopped primarily by EPA and other concerned groups. At the present time the Corps Engineers is disposing of all dredgings in 5 open water sites in San Francisco Bay and in the ocean at the continental shelf. One of these sites has just recently closed leaving only four sites. The sites are specifically designated to receive spoil which has been classified through tests into three groups: non-polluted, polluted with organics, or polluted with minerals. EPA seems to be more lenient in regards to water disposal site than they are to using coastal land sites. The theory is that marine and aquatic life in the bay has already become acclimated to the pollutants in the bay and the additional amounts added from the dumping of dredge will not be harmful. They are not sure that this same theory is applicable to dumping dredge material in the ocean. Therefore, they are sponsoring several studies to actually determine the problems involved in disposing offshore, both in the bay and the ocean, whether the polluting is as extensive as thought, and where this material actually goes when dumped offshore.

At the present time Crossover Systems, Inc. is experimenting with the extraction of minerals from harbor dredge, and International Engineering is preparing a report which covers landfills and costs of same as far as 60 miles inland. One firm is experimenting with aerating the material to dry it out faster. Dredging from parts of the Sacramento River is being stockpiled for use by the Dept. of Transportation. This is primarily sand dredging. Other areas are dredged strictly for sand also. Aside from those mentioned above, the Corps has had no request for dredged material.

The Port of San Francisco is presently constructing a new pier #94. This is going to require quite a bit of fill over an area which was previously used as a disposal site. Much of the existing material is being removed and dumped offshore due to its poor characteristics. This was a diked area where the dike was built out of paper, rubbish and debris and mixed with dredged spoil. This method was used because a rip-rap dike would be too heavy and sink into the bay mud. This can no longer be utilized because of the Water Quality Control Commission. The commission did allow the Port to line the bank with dredged material to keep sulphides from reaching into the bay.

Other areas where harbor dredge could be utilized would be in the diking of many islands along the San Joaquin River and also in the filling of many salt beds presently along the coast and returning them to marshes.

I was able to obtain several studies and also city and regional land use maps both existing and future.

GREEN ASSOCIATES, INC.

MEMORANDUM

To: Victor Elias
From: Tom Watchinsky
Subject: Dredged Spoil Study

Date: 10-5-73
Contract No: 8173

File

Gulf Coast

Conversations with the Texas Aggregates Association and several of that organization's members reveal the following facts.

Several large firms operating in the Houston area currently drag large quantities of sand and gravel from Eagle Lake about 80 miles west of Houston. This source was estimated to last from 10 to 50 years by different sources. Operators in the area have few plans for future sources. The price of aggregates in the Houston area is \$1.00 to \$1.25 per ton for sand and \$2.00 per ton for gravel. Since a good part of the material handled in this area is dragged from a lake, there are not many pits that could be filled. Past proposals to spread spoils in the marshes in this area have met opposition from environmentalists (see EIS on San Antonio Bay by Galveston District - Corps of Engineers). Houston sources felt that use of dredgings from that city's port was not feasible for aggregate since the material is mostly silt. One source expressed the opinion that dredgings from Galveston Harbor might be used for aggregate since he believes that material to be mostly sand.

One source contacted in the Dallas area that also now takes material out of Eagle Lake would be interested in exploring the use of dredgings as aggregate and as fill material. Dallas has a program underway to reclaim old surface pits.

Conversations with the Mississippi Concrete and Aggregate Producers Association and 3 of its member (there are only six members who represent 80% of the State's business) established the following.

In the State of Mississippi there is a constant and plentiful supply of sand but there is a critically short supply of aggregate of the one to one-and-a-half inch class. Present sources are the Mississippi River and surface pits at Crystal Springs near Hattysburg. These sources are expected to last for 50 years at present rates of use. Present price of sand and gravel in the area is \$1.00 to \$2.00 per ton. When questioned about possible use of dredgings as aggregate, no one was interested unless 1" to 1½" material would be available. When questioned about disposal in worked-out pits, sources indicated they thought that this was a good idea except that they felt transportation to their area would be prohibitively expensive, since most of the sand and gravel industry in this area seems to be located some distance from the coast.

GREEN ASSOCIATES, INC.

MEMORANDUM

To: Victor Elias
From: Tom Watchinsky
Subject: Dredged Spoil Study

Date: 10-5-73
Contract No: 8173

The following is a summary of contacts with the 2 sources you gave me in New York.

1. Paul Schmidt, President
Clarence Sand and Gravel Co.
10725 Stage Road
Clarence, N.Y. 14031

This firm services the Buffalo-Niagara Falls area and claims to have about 75% of that area's business. Present sources are surface pits in the Clarence area within 5 miles of their plant. These sources are expected to last 5 years for coarse aggregate and 20 years for sand. The firm has additional land holdings in the area for future use. Sand and gravel price is \$3.40 per ton. Mr. Schmidt indicated that he would be interested in exploring use of dredgings as aggregate if sand content is sufficient to produce profitable operation. Abandoned pits in the area are already designated as sanitary landfill projects. Clarence is located 40 miles south of Lake Ontario and 30 miles east of Lake Erie.

2. Dan Gernatt, Jr.
Dan Gernatt Gravel Products
Richardson Road
Collins, N.Y. 14034

This firm conducts a small operation in the Buffalo area. Present source of sand and gravel is surface pits in the vicinity within 2000 feet of plant. These sources will last 10 years and exploration is under way for additional deposits. Sand and gravel prices are \$2.25 to \$2.85 per ton. When questioned about aggregate use of spoils, Mr. Gernatt was rather vague and didn't know whether this would be feasible. When questioned about disposal of spoils in worked-out pits, Mr. Gernatt thought this was a good idea except that he doesn't have many worked-out pits.

GREEN ASSOCIATES, INC.

MEMORANDUM

To: Victor Elias
From: Tom Watchinsky
Subject: Dredged Spoil Study

Date: 9-28-73

Contract No: 8173

File

Pacific Coast

Telephone contacts with Aggregate Associations and sand and gravel supplies on the Pacific Coast reveal the following information.

Portland, Oregon Area - Of all areas contacted, this area is the most promising for uses of dredged sand and gravel as aggregate. In the past sand and gravel for this area have been dragged out of the Willamette River which use to be a constantly replenishing source. More recently the source has begun to deplete due to flood control dams built by the Corps of Engineers stopping the drift of particles downstream. This river source is further complicated by the fact that all lands below mean low water are owned by the state of Oregon. Royalties must be paid to the state for materials taken from these lands. Suppliers in this area do own considerable deposits that they bought years ago for future development. However, great difficulty is being encountered in opening these pits because of the expansion of urban areas. The suppliers are under pressure by planning groups to turn over their holdings for housing development. Sand and gravel prices in this area range from \$3.50 to \$4.50 per cubic yard at the plant. When questioned about possible disposal of dredged spoil by the Corps, sources appeared to be quite interested since this state has a surface mine reclamation law. Additional information and literature is being forwarded by the Oregon Concrete and Aggregate Producers Association.

Seattle, Washington Area

The major source of sand and gravel for the Seattle area is the extensive Steilicoom deposit near Puget Sound. This deposit is expected to supply the needs of the area for 50 years. Some exploration has been done to locate new deposits. Sand prices in the area are \$1.00 to \$1.15 per ton at the plant. When questioned about Corps disposal in dug-out pits, sources indicated that in their opinion the material they have seen dredged in the area would be unsuitable for fill. Much of the operation at the Steilicoom location involves the cutting away of bluffs which leaves no holes to be filled. Operators in the area sometimes have their own problems disposing of unsuitable material cut from the bluffs.

San Francisco - Oakland Area

Sources of sand and gravel for the northern California and Bay area include scattered surface pits and dragging from the San Juaqin River, Monterey Bay, and the Russian River. These sources are expected to last from 30 to 50 years.

Few suppliers have formulated any long-range plans for additional sources. The Corps did studies of this area in 1965 and 1970. (Sacramento District) Sand and gravel sell for about \$2.00 per ton in this area. The Port of Oakland Authority has already studied the possibility of using dredgings as aggregate and concluded that the project is not feasible. Reactions to Corps disposal projects were varied. In the San Francisco area abandoned pits are being used as sanitary land fills with the strippings used as cover material. This is being done in conjunction with municipalities and as a private venture. The Lone Star pits near Oakland are scheduled to become recreational lakes due to a high water table in the area. The Rose and Jamison Co. of Oakland expressed an interest in spoil disposal in abandoned pits if the land could be reclaimed in the process. New pits can not be opened in this area until their ultimate use has been planned.

GREEN ASSOCIATES, INC.

MEMORANDUM

To: Victor Elias
From: Tom Watchinsky
Subject: Dredged Spoil Study

Date: 10-12-73

Contract No: 8173

File

The following information obtained from additional contacts in the Portland, Oregon area should be added to my previous memo on the Pacific Coast.

Discussions with several large sand and gravel operators in the Portland area confirm the fact that deposits in the Willamette River are depleting. These operators expressed more interest in possible commercial applications of dredged material than in landfill uses, although there was interest in landfilling since Oregon has a surface mine reclamation law. One source reported that he currently uses dredgings piled on the River bank by the Corps when they occasionally dredge the Willamette River channel but there is not enough of this material available. Other sources expressed pessimism about the quality of maintenance dredging material from Portland Harbor. The State of Oregon is reportedly currently using maintenance dredgings as fill behind bulkheads in the Harbor area. Some sources contacted were unwilling to divulge their annual volume figures but the following figures were obtained.

Willamette Hi-Grade Concrete Co. - One million cubic yards of sand and gravel per year. (Present river source estimated to last two years).

Corvallis Sand and Gravel - 300,000 to 500,000 cubic yards per year.

I have been supplied with a list of contacts in all 90 of the Oregon Concrete Producers Ass'n members if you want me to make any further inquiries (six made to date).

APPENDIX C

SELECTED MEMORANDA OF

TELEPHONE CONTACTS

DRAFT

Page 1 of 12

Memo To: File, cc: E.D., V.E., R.R.

Date: September 24, 1973

From: E. Lee Moser

Contract No.: 8173

Subject: Dredge Spoil Study
Gulf Coast Summary of
Telephone Conversations

INTRODUCTION

The objectives and method of study for this region were the same as the Pacific Region with information being secured by telephone interview and followup letter to all appropriate public and private organizations. Refer to the Pacific Region report for further explanation.

The focal cities in this region that have contributed substantial percentages of the dredge spoil are Mobile, Alabama, New Orleans, Louisiana and Galveston, Texas. Attention was not focused on these cities exclusively, but on all the urbanized areas along the Gulf Coast from Corpus Christi, Texas to Mobile, Alabama. Harbors, channels, and the intercoastal waterway were all evaluated.

SOURCE OF INFORMATION

Regional planning groups, State Chambers of Commerce and state government agencies were identified by use of nationwide directories, telephone directories and consultation which is the same method used in the Pacific Region. The names of governmental organizations vary greatly from one state to another, however, success was achieved in locating the departments and divisions who were completely familiar with spoil disposal and its possibility as a landfill resource material. Extensive inquiries were made to identify those key groups which had specific knowledge or who had a broad range of diversified knowledge and extensive daily relationships with others that could make a significant input to the study.

The following agencies were contacted in the state governments of Alabama, Louisiana, Mississippi, and Texas.

Alabama:

Department of Conservation and Natural Resources - Marine Resources
Office of Development
Department of Highways - Bureau of Research and Development.

Louisiana:

Wildlife and Fisheries Commission
Department of Conservation
Department of Planning
Department of Commerce and Industry
Department of Highways - Materials and Research
Department of Public Works

Mississippi:

Air and Water Pollution Control Commission
Game and Fish Commission
Research and Development Center - Community Planning
Economic Council
Department of Highways - Research and Development

Texas:

Department of Parks and Wildlife
Environmental Planning
Division of Industrial Economic Research
Department of Highways - Planning and Research

SUMMARY OF CONVERSATIONS BY SOURCE

Regional Planning Groups - Alabama

One suggested use for spoil is to prevent beach erosion by strategic placement of berms if the sand content is high.

Low areas along the causeway could be filled but environmental interest groups would attempt to stop this application. Spoil material could be used as a cover for sanitary landfills in the southern part of the state due to other cover shortages.

Regional Planning Groups - Louisiana

A group described a previous experiment wherein dredge spoil was sought as cover material for a sanitary landfill site, but the spoil was not made available. A considerable number recommended this material as a cover for solid waste landfills since the low lying areas of the state have a short supply of any kind of cover. In some instances, material has to be trucked in from other locales. Another use recommended was to fill borrow pits to their original contour and configuration. Reclaiming inundated marshland could be possible with spoil if the quantities were almost unlimited. An inland area planning agency stated that they had never considered the potentials or problems of spoil usage.

Those groups contacted who had no present applications or had not considered using spoil before expressed an interest in using it when readily available.

Regional Planning Groups - Mississippi

If available spoil should have a high permeability, then certain areas of the state could be opened up for residential development by allowing septic tank installation. Present soils are very high in clay content but could be improved substantially if mixed with sandy spoil. Considerable thought has been given to the problems of spoil disposal because of the negative impact on fisheries but not specific applications.

Regional Planning Groups - Texas

To date, spoil disposal in open water has caused problems to the shrimp, oyster and fish habitats. It was suggested that where any large open area is being filled with spoil, airplane seeding could be used to prevent erosion. Specific uses recommended were as fill for port development, marine nursery development, wildlife habitat creation or preservation.

Chamber of Commerce - Alabama

No present applications for spoil was known on the spur-of-the moment but they would investigate it.

Chamber of Commerce - Galveston

Within this Chamber, there presently exists a task force of developers and business men who are studying how and to what extent filled land area can be used to solve their housing shortage. They strongly feel that dredge spoil might be the fill material which they are seeking to create additional urban land in the Galveston area proper. To date, many homes have had to be designed with substantial foundations because of the unstable earth at sea level. This

has priced them out of the low cost housing market which they were attempting to satisfy. Their hope is that spoil can help to establish a solid base on which to construct these low cost homes.

Chamber of Commerce - Houston

People in this area have two basic thoughts about dredge spoil usage. If it is generated from a newly constructed channel, everybody wants it; if it is from a channel just being maintained, nobody wants it. Spoil composition in the greater Houston area is very unstable and bad experiences have resulted from its use. These bad experiences have made spoil usage a political matter as well as a technical problem. Many public officials and local groups are debating the subject. Port facilities were expanded with spoil fill but problems of settlement occurred, which represents only one of the bad experiences.

STATE GOVERNMENT AGENCIES

Alabama - Department of Conservation and Natural Resources

In a recent study they performed, one use of spoil proposed was to create underwater plateaus for oyster seed beds to stimulate the shellfish industry. Because of the hurricane influence, beaches are eroded to the point of interfering with natural current flows. To offset this, adjacent areas are presently dredged with the material being returned to its original source. Another possible use cited is to reclaim the sand by separating the clay and other organic and inorganic matter. However, this last application may not be competitive with extraction from natural sand deposits. A copy of the study has been sent to us.

Alabama - Office of Development

Inquiries will have to be made to others in their organization to determine the extent of present spoil usage.

Alabama - Department of Highways

Using spoil as fill for road construction has not been practiced because of its unstable qualities. Spoil that is being generated as a result of a major bridge being constructed across Mobile Bay will be used to expand the land area of an existing park to allow the development of a boat launching area, picnicking area and other water related recreational activities.

Louisiana - Wildlife and Fisheries Commission

Extensive areas of New Orleans is built on fill material dredged from the Mississippi River providing additional residential and industrial land. At the present time, no application is made to agricultural purposes. In some marshy areas, roads are constructed using spoil. Lake Pontchartrain is being dredged with the spoil being used as runway extensions for the airport.

In some cases, private contractors are encouraged to take the fill with no charge if they will dredge it from the lake. Levees and dikes have been constructed of spoil to prevent flooding and control erosion. Diked disposal areas are created in some locations to just confine the spoil to one spot. Private land owners in some cases have used the spoil for private road construction.

Louisiana - Department of Planning

In some coastal areas, dredge spoil has been used as roadbed fill, but there has been a shortage of stable spoil for this application. Urban areas have been extended with spoil. It is conceivable that the proposed 20,000 acre airport near New Orleans would use spoil for fill.

Louisiana - Department of Commerce and Industry

In the planning stage is a super port location near Grand Isle that is to be used for off-shore unloading of ships. Fill in large quantities will be needed for this. Spoil can be used for fill for residential development in the New Orleans area. Several thousand acres near Baton Rouge is destined for industrial and commercial development to complement the deep water shipping industry. Fill will be needed at this location. Plans are underway for a vastly improved highway network along the coast to serve as a hurricane and tidal wave evacuation route. Spoil could be utilized here to increase the elevation.

Louisiana - Department of Highways

Dredge spoil is being used to some extent as fill for the base of public roads. However, this is not a widespread application since the spoil material has not uniformly compacted resulting in settlement problems and soft spots which is currently under investigation.

Louisiana - Department of Public Works

Land areas have been extended to provide for further development. Levees have been backfilled with spoil. Embankments along roads, including some of Interstate system have been constructed from dredge spoil.

Mississippi - Air and Water Pollution Control Commission

Dredge spoil has had some limited use as fill material in the coastal part of the state for urban development but there has been a series of problems resulting from the pollutants draining back into the waterways. Dikes have been constructed to some small extent by mixing dredge spoil and earth together.

Mississippi - Game and Fish Commission

This organization has not had any experience in using dredge spoil, but one possibility was mentioned. In an agricultural region of the state, pesticides such as DDT which have a long residual life, are being washed into lakes which are attractive sport fishing areas. Fish are dying after feeding on the marine plant life and the DDT on the lake bottom. If impurities and waste can be removed from the spoil, maybe it can be pumped onto the lake bottom to prevent fish from coming in contact with the pesticides.

Mississippi - Research and Development Center

To some extent, dredge spoil has been used to create industrial land along the Mississippi River at Vicksburg. Dikes have been constructed out of spoil to an extent. They recommended that one application might be for fill in roadway construction.

Mississippi - Economic Council

Spoil material is known by this organization but they do not know how it is being used on-the-spur-of-the-moment. Probably the largest use is land reclamation along the channels being dredged. They expressed the need for more information about the physical, chemical, and hydraulic characteristics.

Mississippi - Department of Highways

The use of dredge spoil for highway and road construction has been tried in this state but it has not been a practical application. Oyster shells mixed with earth and cement has been a satisfactory base course whereas dredge spoil has not.

Texas - Department of Parks and Wildlife

This organization deals with spoil disposal daily but they have not solved the problems of how to use it considering its pollution content. No specific applications were cited, but this information will be included in reports they will send us.

Texas - Environmental Planning

Studies are currently underway, which will be sent to us, to investigate ultimate uses for spoil material. Previously it has been used for industrial development fill along the coastal area, but not to any extent inland. Consideration is being given to using spoil for grass land establishment.

Texas - Division of Industrial Economic Research

The subject of dredge spoil is known by this division, but they will have to contact their various sections for specific present and future applications.

Texas - Department of Highways

Dredge spoil disposal is a foreign subject to this department, therefore, it has not been used before, but they are eager to "brainstorm" the subject.

SUMMARY OF REGIONAL USAGE

Rather consistently, it was recommended that dredge spoil be used as cover for solid waste landfills in the low lying southern part of the Gulf states because of the shortage of other suitable cover. Other uses cited by regional planning agencies were the construction of berms to prevent beach erosions and reclaiming inundated marshland. Another use suggested was to mix the spoil with soils of high clay content to achieve a permeable mixture that will allow the use of septic tank systems for residential development. Port development, establishment of marine nurseries, and preservation of wildlife habitats were additional uses mentioned by regional planning agencies. There were some planning agencies inland who had not used spoil before but expressed an interest in its use when made readily available.

The Chamber of Commerce in the Galveston, Texas area thinks that the use of spoil may be a great help in fulfilling a housing shortage by creating additional land for urban development. Spoil usage in the Houston area has been both good and bad. It has been used successfully in some small way for fill applications but in many situations it has served to generate more problems than it has solved because of its unstable characteristics. Disposal has now become a political matter as much as a technical problem.

The Department of Natural Resources in Alabama is exploring the feasibility of using spoil to create underwater plateaus for oyster seed beds. Beach nourishment has been possible with spoil usage and thought is being given to ways of reclaiming the sand from the mixture. Near Mobile Bay, an existing park is being expanded by use of spoil generated by bridge construction. Not much success has been achieved by applying spoil to roadbed construction because of its inability to remain stable and not settle. One state department contacted was not aware of the extent of spoil usage in their area of specialty but would consult with others.

In the state of Louisiana, spoil has been used extensively for land fill for urban development since so much of the land in the southern part of the state is at or below sea level. Some use has been applied to roadway construction successfully, namely embankment fill, but as roadbed fill spoil has not been suitable because of soft spots occurring. Some private roads have been developed without problems, primarily because their use is not as great as the public roads. It is possible that the proposed highway network along the coastline for hurricane evacuation purposes can use substantial quantities of fill. Levees and dikes have been constructed for flood control by use of spoil material along the low lying areas. Spoil has been used as fill for runway extensions at the present airport and probably will be used for the 20,000 acre airport proposed for the greater New Orleans area. An extensive off-shore super port near Grand Isle can probably use substantial quantities of fill when development starts. Residential areas in and around New Orleans have used tremendous quantities of spoil because the existing land is below sea level. Several thousand acres near Baton Rouge is planned for industrial and commercial development to complement the shipping industry along the Mississippi River. Spoil may be used in this application as fill material.

Dredge spoil has been used as fill to some limited extent along the coastal part of Mississippi but pollutants draining from it into the surrounding water areas have been a serious problem. As a means of combatting this, dikes composed of spoil and earth have been devised. Land reclamation and landfill are the biggest present applications for spoil. The Game and Fish Commission has not had any first hand experience in using spoil but they think that if the

spoil can be "purified", it could be placed on lake bottoms to prevent fish from feeding on pesticides that have drained into the lake from nearby agricultural areas. One state agency did not know on-the-spur-of-the-moment how spoil was being used but was eager to talk to others in the area about the subject.

In Texas, spoil is a very familiar subject and its possible uses are documented in various reports that are being sent to us. Studies are in progress now that deal with long range plans for disposal along the coastal area. Appropriate portions of the studies will be supplied. Industrial development has been one of the bigger applications. Consideration is being given to the establishment and preservation of grass lands for cattle grazing. The Department of Highways has not been exposed to spoil usage before but wish to "brainstorm" the subject.

Generally, all groups contacted expressed a keen interest in sharing their ideas or experiences with us and supplying copies of reports and studies. In most cases, the person contacted wanted to solicit input from his associates so that a more comprehensive reply could be made to the questions in our letter, rather than just relying on their spur-of-the-moment responses over the telephone.

D R A F T

MEMO TO: File DATE: October 4, 1973
CC: E. D., V. E., R. R. CONTRACT NO.: 8173
FROM E. Lee Moser *ELM*
SUBJECT: Dredge Spoil Study
Summary of Telephone Conversations for Mid Atlantic
Coast Region

INTRODUCTION

The objectives and method of study for this region were the same as the other regions of the country. Information was secured by telephone interviews and follow-up letters to all appropriate public and private organizations. Refer to the Pacific Region report for further explanation.

Attention was focused on the rivers, bays, canals and harbors associated with the major port cities of Philadelphia, Pennsylvania, Baltimore, Maryland, and Norfolk-Hampton Roads - Newport News, Virginia in the Mid-Atlantic Coastal Region.

SOURCE OF INFORMATION

Regional planning groups, State Chamber of Commerce and State Government agencies were identified by use of nationwide directories, telephone directories and consultation, which is the same method used in the other regions. The names of governmental organizations may vary greatly from one state to another; however, success was achieved in locating the departments and divisions which were completely familiar with spoil disposal and its possibility as a landfill resource material. Extensive inquiries were made to identify those key groups which had specific knowledge or who had a broad range of diversified knowledge and extensive relationships with others that could make a significant input to the study.

The following agencies were contacted in the State Governments of Maryland, Pennsylvania, Virginia, and the regional areas of the District of Columbia and Delaware.

Wilmington Metropolitan Area Planning and Coordinating Council

District of Columbia

Metropolitan Washington Council of Governments

Maryland

Department of Economic and Community Planning
Department of Transportation - Port Administration

Pennsylvania

Bureau of Land Protection
Department of Planning and Development - Physical Land Planning
Department of Commerce - Bureau of Economic Development

Virginia

Institute of Marine Resources
Marine Resources Commission
Department of Conservation and Economic Development
Department of Planning - Office of Environmental Resources
 - Community Planning
Division of Industrial Development

Summary of Conversations by Source

Regional Planning Groups - Delaware

One Planning Group near Wilmington did not know if any present use was being made of dredge spoil. Using it as cover for sanitary land fill sites probably is not a good future application they stated, because land fills in general are frowned upon since an existing one is contaminating a ground water supply due to leaching.

Regional Planning Groups - District of Columbia

The Metropolitan Washington Council of Governments did not know of any present applications. On-the-spur-of-the-moment they recommended that spoil be used as an aggregate in the brick manufacturing process if sufficient quantity and quality exists. Another use might be to combine spoil with sludge from the waste water treatment process to create another soil additive. Sludge is being tested at the Beltsville Plant Industry Station in an ongoing series of experiments at the present time. The application of spoil as fill for a heliport base was also mentioned. They requested more information about the physical and chemical characteristics.

Regional Planning Groups - Maryland

The Regional Planning Council of Metropolitan Baltimore cited the proposed long range plan to use fifty (50) million cubic yards of spoil at Hart & Miller Islands near the Black Marsh wetland as described in the report, An Evaluation of the Baltimore Harbor Land Use Potential, February 1973. Specific mention was made of the negative reaction environmental interest groups have taken about filling in these wetland areas. No other present or proposed uses were described for the Baltimore Harbor.

People of Western Maryland counties are not using spoil for landfill, but the Tri-County Council suggested that it may be applicable to filling in strip mines. At the present time, they are receiving fly ash from the Eastern shore and are studying the possibility of using processed garbage from the same location. More specific information will be supplied in their written response. They expressed a continued interest in our study results and requested more technical details when available. They cannot supply regional plans describing the above strip mine locations since they are just now in the preparatory stage. Planning

agencies in each of Central Maryland and Southern Maryland were not aware of spoil usage or availability but expressed an interest in supplying recommendations. The people represented by the Delmarva Advisory Council have been using spoil successfully as landfill for several years. Most of the land extensions in the Eastern shore and Southern Chesapeake Bay area have been created by dredge spoil. Only material that drains well has been used, no sludge or industrial wastes have been practical. Whenever available, oyster shells are also used as landfill material. The E. P. A. has stopped the use of dredges spoil because of the pollution draining from it back into the water. Docks, parking lots and industrial sites have been some of the applications. Further information will be supplied in their written response.

Regional Planning Groups - Pennsylvania

Of the planning groups contacted, ninety percent of them said they did not know of the availability of spoil as a land fill resource or they did not know of any present applications. Many said that spoil disposal in their area would compound an already existing problem - finding uses for the overburden from the mining operation. The Council of Governments of Northern Lancaster County stated they would cite specific applications for present usage in their written response. Depleted quarries may be an application suggested several of the planning groups. The Lower Anthracite Regional Economic Development organization of Mount Carmel suggested that dredge spoil and mine overburden be mixed to achieve a material that may have unique characteristics for sustaining plant growth. They would like to be informed of the study results. The Lackawanna Regional Planning Commission of Scranton suggested that layers of compacted junk vehicles and dredge spoil be used to fill in abandoned strip mines. They could use some of the material at this time for fill applications, provided it is not Philadelphia's garbage. More specifics will be provided in their letter. Spoils may have been

used along Lake Erie to create industrial sites says the Erie Metropolitan Planning Commission. All groups who responded that they were not aware of present usage, reported they would provide recommendations in their respective letters. The Delaware Valley Regional Planning Commission in Philadelphia stated that some real estate developers are presently filling along the Delaware River to create industrial sites, although they were not aware of the exact extent. Some thought is being given to using the waste from incinerators as fill for recreational lands. Quarries and strip mines were also mentioned by this group as potential applications.

Regional Planning Groups - Virginia

The planning agencies contacted in Virginia stated they were aware of spoil as a potential resource but did not have much information about its present applications. Several of the major ship building companies in Newport News use spoil as fill for their docking facilities. Recommendations that were made are used as cover for sanitary landfill operations and fill for depleted sand and gravel quarries.

Chamber of Commerce - Metropolitan Baltimore

This organization was not aware of any present usage of spoil by real estate developers, business or industrial firms, however, they expressed an interest in contacting their member to get recommendations for future use.

Chamber of Commerce - Pennsylvania

The people represented by this Chamber are generally aware of the availability of dredge spoil and some of its uses, but they have not concentrated on this because their attention has been focused on more pressing environmental problems - air and water quality.

They were interested to think about the questions that the study raises and to solicit input from their local Chamber members.

Chamber of Commerce - Virginia

Several recommendations that were mentioned in addition to fill for real estate development were as a component in soil mixtures and as fill for strip mines in the Western part of the state. They wanted to consult with their member chambers along the coastal area for use recommendations in response to the letter.

STATE GOVERNMENT AGENCIES

Maryland - Department of Economic and Community Planning

Spoil has previously been used as fill in various low lying areas near Ocean City but ecological interest groups have been discouraging this. The port of Crisfield has been expanded by utilizing spoil over the past several years. A very satisfactory result occurred in Crisfield because the material dried very rapidly resulting in a considerable time savings for the project. The recent passage of a new law in Maryland is encouraging private land owners along shorelines to dredge the water area immediately adjacent to their land for reclamation purposes to offset the coastal erosion. Further recommendations for future applications will be forthcoming in their written response.

Maryland - Department of Transportation

This group made reference to the planned diked disposal area near Hart & Miller Islands as also cited by the Regional Planning Council of Metropolitan Baltimore in their study, An Evaluation of the Baltimore Harbor Land Use Potential, February, 1973.

Pennsylvania - Bureau of Land Protection

Dredge spoil has been used as fill from newly excavated channels without any problem, but spoil from channels that are being maintained has caused contamination of the ground water in the high water table areas. Considering long range applications, they think spoil can be used to fill strip mines. Further recommendations will be supplied after they consult with the other divisions in the department.

Pennsylvania - Department of Planning and Development

This department was remotely familiar with spoil applications but could not cite specific uses. They stated that they would provide recommendations after consulting with the division heads who have first hand information. An interest was expressed to have more information about the physical characteristics and exact compositions of the spoil in the Philadelphia area.

Pennsylvania - Department of Commerce

Industrial developers, as reported by this department, have made only limited use of spoil material for development purposes along the coastal area. At the present time, if spoil was hauled inland for ultimate disposal in its raw or in a processed form, it would be resoundingly refused because of bad experiences people have had with waste of various types coming from Philadelphia area. Within the past several years, solid waste and sewage sludge has been hauled by railroad car and truck from Philadelphia to the strip mining and quarry areas of the state. Because of contamination, spillage, and leaching problems, the sludge has become a nuisance and local problem. The people inland have strongly opposed this method of disposal, and so called useful application, because they feel their respective areas are becoming the dumping area for Philadelphia's

trash and waste products and therefore, being treated as second-class citizens. When the question of accepting or rejecting sewerage sludge is placed on a referendum ballot, it is always defeated not only due to the nuisance problem but because of the false claims and unmet promises of Philadelphia politicians. Offsetting the bad atmosphere of the inland waste disposal problem is the good reputation achieved by the Corps of Engineers as a result of their rehabilitation and restoration work along the Susquehanna River caused by the Tropical Storm Agnes flooding. This current reputation should be a positive point to consider in trying to transport dredge spoil inland. No applications are known at this point in time for spoil material but they were anxious to present the proposition of having another "resource" available for land fill to developers throughout the state. Consultations will also be made with other department officials for their recommendations.

Virginia - Institute of Marine Resources

Research work is continuing on the adaptability of various types of marsh grass to the varying spoil characteristics of the Virginia coastal area. Other research related to spoil usage is in progress which will be explained further in their written response to our letter.

Virginia - Marine Resources Commission

Not much was known about spoil usage by this group other than they were aware of the regulations concerning it's disposal. Recommendations for practical uses will be provided after they think about the subject.

Virginia - Department of Planning

At the present time, an active task force of all state departments and agencies is continuing their evaluation of the spoil disposal problem by developing specific

plans for ultimate usage. Agencies related to highways, economic and industrial development, water quality, parks, natural resources and others have been represented in addition to the Planning Department. A final report is not yet approved for publication. Previously spoil has been used as land fill along the coastal areas and tributaries to the Chesapeake Bay to create or reclaim areas for real estate development. Consideration has been given to applying spoil to the beach and dune areas to help stabilize them and as a source of sand for recreational purposes at Virginia Beach. The required quantities needed for some of their proposed applications would have to be expressed in cubic miles rather than in cubic yards, they claim. More specific details about possible applications and the quantity of spoil material needed to fulfill the anticipated applications will be supplied in their written response.

Virginia - Division of Industrial Development

At the present time, spoil is dumped into a 2,500 acre diked area in the Hampton Roads Harbor called Craney Island. Capacity will not be achieved until nine (9) years from now but since a more practical long range application has not been found, a recommendation has been made to the Corps to increase the final elevation another 5-10 feet.

Many officials in the state government feel that the ultimate answer to the spoil problem is to dispose of it by dumping into the open sea. Presently, only limited assumptions exist about the detrimental effect of this action on sea water and marine life. Scientific data and actual facts are virtually non-existent. Several research organizations, including the Marine Resources Commission in Newport News, are actively seeking research grant money to undertake studies that will positively answer the question about how much spoil the open sea can absorb by counteracting the contaminating effect on marine life. This group reiterated

the ongoing work of the special task force, as mentioned above, set up to recommend to the Corps ultimate solutions to the spoil disposal problem.

Some consideration has been given to pumping the spoil inland for seven (7) or eight (8) miles for fill applications but this would only serve to change its location since land for development is not in short supply and they have not conceived any particular use after having it transported. The transportation cost restraint as well as the leaching problem and the instability of the finished grade have been prohibitive factors for effective usage.

In conjunction with private developers and federal government agencies, some thought is being given to creating off-shore man-made islands near Norfolk for resort development and a munitions unloading area for all the military vessels.

Industrial land in the Norfolk-Hampton Roads area is not in short supply so spoil does not have an immediate application to this area. There is no interest in developing industrial sites in the Metropolitan Washington, D.C. area because of the prohibitive land prices for large parcels. In the future there may be some interest shown by developers to fill wetlands around Richmond which are ecologically insignificant. A need may exist to construct dikes at specific locations along the James River from Richmond to the Chesapeake Bay with spoil being used as backfill material.

Further information about their experiences will be supplied in writing including the progress and recommendations of the task force.

Summary of Regional Usage

Regional planning agencies contacted reported a variety of experiences with dredge spoil usage from no experience to extremely successful applications. An agency in Wilmington, Delaware conjectured that spoil could not be used in a land fill application in their state since they already have a problem with the contamination of ground water from sanitary land fill sites. No present uses

were known. The Metropolitan Washington Council of Governments in the District of Columbia reported no present usage but suggested that spoil could be a raw material component for top soil mixtures, or as fill for heliports. The Regional Planning Council for Metropolitan Baltimore stated that most of the spoil from the Baltimore Harbor will be placed in the diked disposal areas near Hart & Miller Islands provided that the environmental interest groups can be convinced that it will not have a long range detrimental effect on the Bay's ecological systems. People of Western, Central and Southern Maryland generally reported a lack of any first hand usage information but suggested that it be used as fill for the depleted strip mines in the Western counties. At the other extreme, people on the Eastern shore have been successfully using spoil for fill for docks, parking lots and industrial sites for some time prior to having this application stopped by the E. P. A. because of water contamination. Only the material that would drain well was used, no sludge or industrial wastes were ever suitable.

The majority of the planning agencies in Pennsylvania reported a lack of knowledge of spoil as a land fill resource material. Most stated it could add to their already existing problem of what to do with the overburden from the strip coal mines. The Lower Anthracite Regional Economic Development Organization of Mount Carmel suggested that possibly the spoil and mine overburden be mixed to achieve a material that could sustain plan growth. Other agencies suggested that quarries be filled with the spoil. In Scranton, the Lackawanna Regional Planning Commission defined a process of combining compacted junk vehicles and dredge spoil in layers to fill strip mines or other large man-made cavities in the earth's surface. They have several land fill sites at the present time where spoil could be utilized if the material could be transported to their location economically. The Delaware Valley Regional Planning Commission in Philadelphia reported that some real estate developers are creating industrial sites along the Delaware River at this time by using spoil. They also suggested that a long

range inland application may be to use spoil to fill strip mines and quarries.

Virginia Regional Planning agencies stated they have a general familiarity with the spoil disposal subject but not much knowledge of present applications. Ship manufacturers in Newport News area do use some spoil in their docking facilities. Here again, the suggestion was made to fill depleted quarries or as a cover for sanitary land fill sites.

The subject of spoil was generally known by the Chamber's of Commerce but not present applications, Pennsylvania's State Chamber stated their most pressing concern is with air and water quality and have not concentrated much attention on dredge spoil. The State Chamber in Virginia recommended spoil as fill for real estate development and the strip mines in the Western part of the state as well as a component in soil mixtures.

The agencies in the State of Maryland Government made consistent reference to the plan to dispose of spoil by containing it in the diked disposal area near Hart & Miller Islands provided environmentalists do not block this technique. Both the Department of Transportation and the Department of Economics and Community Planning cited this as the partial solution to the states disposal problem. The Department of Economics and Community Planning reported that spoil has been used as fill for real estate development in the Ocean City area and port development in the Crisfield area. Results in Crisfield were very successful because of its fast drying time and it's consequent cost savings.

The Bureau of Land Protection for Pennsylvania stated that spoil from newly cut channels has been used for fill without problems but spoil from channels being maintained has caused problems of ground water contamination. It is their recommendation that the strip mining region of the state be considered as the ultimate destination of much of their spoil. The Department of Commerce reported that

real estate developers along the coast are making just limited use of the spoil. No recommendation would be made to transport spoil inland because of the extremely bad experiences people have had with the disposal of solid waste from Philadelphia. Small towns and rural areas have been confronted with problems of contamination, spillage, leaching, false claims and unfulfilled political promises. However, offsetting the above problem of solid waste disposal may be the good reputation the Corps achieved as a result of their flood damage rehabilitation work necessitated by Tropical Storm Agnes.

The Institute of Marine Resources in Virginia is currently conducting research to determine which species of marsh grass are tolerant of dredge spoils or of soils that contain a certain percentage of spoil material. The Department of Planning elaborated on the current progress of the state government task force charged with the responsibility of determining long range practical applications for spoil usage. Their findings and recommendations are awaiting some reaction from the Governor. Historically, spoil has been used to create or reclaim land along the Chesapeake Bay and its tributaries. Some consideration has been given to using the spoil as beach nourishment and dune stabilization. The sand may be separated out to use for recreational purposes at Virginia Beach. They claim that the amount of material needed to fulfill some of the shoreline stabilization applications may have to be measured in cubic miles rather than cubic yards.

The Division of Industrial Development stated that at the present time spoil is contained in a 2,500 acre diked area in Hampton Roads Harbor named Craney Island. This area will be able to accommodate material for another nine (9) years, but a recommendation already exists to raise the finish elevation another 5 - 10 feet

since more practical long range plans have not been formulated. Many state officials think that the ultimate answer is disposal in the open sea. A number of state research organizations are actively seeking financial grants to commence studies that will positively determine what, if any, negative effect spoil will have on the ocean's ecological systems. Some consideration has been given to pumping spoil inland for seven (7) or eight (8) miles to be used as fill but there are no land shortages to justify this action. Land that is suitable for real estate development is readily available. Thought has been given to creating man-made islands near Norfolk for resort development or as unloading stations for all the vessels returning to the naval base with munitions. In the future, there may be a need to construct flood control dikes in the James River from Richmond to the Chesapeake Bay. Spoil could be used as backfill for the dikes.

D R A F T

MEMO TO: File DATE: September 28, 1973
C.C.: E. D., V. E., R. R. CONTRACT NO. 8173
FROM: E. Lee Moser
SUBJECT: Dredge Spoil Study
Summary of telephone conversations for Lake Erie Area

INTRODUCTION

The objectives and method of study for this region were the same as the other regions of the country. Information was secured by telephone interview and follow-up letters to all appropriate public and private organizations. Refer to the Pacific Region report for further explanation.

Attention was focused on the rivers, bays and harbors associated with major port cities along Lake Erie, namely, Cleveland, Sandusky and Toledo, Ohio; Detroit, Saginaw-Bay City, Michigan; and Buffalo, New York.

SOURCE OF INFORMATION

Regional planning groups, State Chambers of Commerce and state government agencies were identified by use of nationwide directories, telephone directories, and consultation, which is the same method used in the other regions. The names of governmental organizations may vary greatly from one state to another; however, success was achieved in locating the departments and divisions which were completely familiar with spoil disposal and its possibility as a landfill resource material. Extensive inquiries were made to identify those key groups which had specific knowledge or who had a broad range of diversified knowledge and extensive relationships with others that could make a significant input to the study.

The following agencies were contacted in the state governments of Michigan, New York and Ohio.

Michigan

Department of Natural Resources - Resource Management
Water Management
Environmental Services

Department of Commerce - Office of Economic Expansion
Department of Transportation - Testing and Research

New York

Department of Environmental Conservation
Department of Parks and Recreation
Office of Planning Services
Department of Commerce
Department of Transportation

Ohio

Department of Natural Resources - Shoreline Management
Water Quality
Department of Economic and Community Planning - Development Planning Division
Department of Highways - Research and Development

SUMMARY OF CONVERSATIONS BY SOURCE

Regional Planning Groups - Michigan

Neither the Regional Planning Agency in the Northeast or Southeast part of the state knew of any present usage for dredge spoil; however, they knew of its availability in a general way. The people in their area will probably use it

when made readily available. Industrial and recreational land usage were the applications that occurred to them on-the-spur-of-the-moment. More specific recommendations will be made after they consult with other planning organizations in their respective areas.

Regional Planning Groups - New York

The Erie and Niagara Counties Regional Planning Board in the Northwest part of the state thinks that probably there is no market for spoil in this highly industrialized area. At the present time, they are having difficulty in locating suitable sites to dump industrial waste and sludge. If dredge spoil was used as an inland landfill material, it would tend to compound their problem of site shortages. Abandoned quarries are used for some of the present industrial waste. This group is very much aware of spoil problems and have already met with the District Corps of Engineers to determine suitable sites for disposal. More information will be provided in their written response. Another group in the Southwest part of the state was not knowledgeable about spoil usage but expressed an interest in responding after consulting with their member groups.

Regional Planning Groups - Ohio

Of the groups contacted, seventy percent stated that they were not aware of spoil as a landfill resource material, or if they were aware of it, there was no present applications. Possible uses recommended were as fill for strip mines or recreational areas near flood plains. One group stated that the flat terrain of many parts of the state does not dictate a need for landfill applications. The Summit County Council of Governments will be evaluating spoil disposal as they undertake a solid waste disposal study. All groups contacted requested more information about the physical, chemical and hydraulic properties and will respond with recommendations for use in a letter.

The Erie Regional Planning Commission has met with the Corps to select possible sites for disposal in the Huron and Sandusky areas of Lake Erie. These areas will be used for recreation or parking of vehicles ultimately. Toledo Metropolitan Area Council of Governments is aware of spoil as a resource but states that in their highly industrialized area, keen competition exists between spoil and fly ash as a fill material, as well as sludge and other industrial wastes. They do not know of any applications on-the-spur-of-the-moment. In the Youngstown area, certain strip mines have been selected as landfill sites but spoil was not considered as the material. Plans will be provided that reflect the landfill locations. Each group will be supplying further information.

Chamber of Commerce - Michigan

This group is aware of dredge spoil as a landfill material but they are not aware of present applications. Contacts will be made with major industrialists and real estate developers for recommendations. Conversations have taken place between this group and the District Corps of Engineers about shipping on the Great Lakes, but spoil usage per se was not one of the subjects.

Chamber of Commerce - New York

Dredge spoil is a foreign subject to this group since their primary responsibility relates to legislative lobbying rather than any specific environmental problem. Despite their lack of first hand knowledge they are going to submit recommendations after discussing the subject with other Chambers.

Chamber of Commerce - Ohio

No present uses are known on-the-spur-of-the-moment but contacts will be made with key business and industrial leaders, real estate developers and local Chambers for their input about present and future applications.

STATE GOVERNMENT AGENCIES

Michigan - Department of Natural Resources

The State of Michigan has done extensive work in conjunction with the Corps of Engineers to find practical uses for dredge spoil. Over the past several years, it has been used for industrial land development, recreation and erosion control. Sandy spoil has been pumped back to the beach area to nourish it and offset the effect of lateral drift. Dikes have been constructed to protect marshy areas which serve as feeding and nesting areas for migratory waterfowl. Plans are under way in cooperation with the Corps to protect and preserve an extensive marsh area near Point Mouillee, south of Detroit, in Wayne and Monroe Counties. This area is extremely valuable as a feeding ground for waterfowl. Plans and information will be supplied to us about the use of spoil for wildlife habitat improvement. Resource management, water management, environmental services, and fish and wildlife will provide input to our study in response to our letter.

Michigan - Department of Commerce

It was not known at the time if spoil has been used for real estate development but some consideration has been given to using it for port facilities near Monroe, south of Detroit.

Fly ash is being used to some extent as fill material. One recommendation was to extract the silica sand if economically feasible compared to natural sand deposits. Information was requested about the physical, chemical and hydraulic characteristics.

Michigan - Department of Highways and Transportation

There is no present use being made of spoil material by this department, but they foresee the possibility of extracting the sand and gravel components for concrete or asphalt aggregates. Further information will be forthcoming in their written response.

New York - Office of Planning Services

No present application is known for spoil usage but they foresee a lot of future applications about which they could not elaborate at the time. Through a system called the State Clearinghouse, input to the study will be solicited from all those state agencies that are knowledgeable about or potential users of dredge spoil, including the Department of Planning field staff near Lake Erie, Department of Commerce, Department of Environmental Conservation and Department of Transportation. Information will be provided by consultation with regional agencies who have not already been contacted, and with appropriate federal agencies such as the Soil Conservation Service. The Clearinghouse is the most expeditious and thorough procedure to secure specific information for the study, they stated. Copies of any applicable study will be supplied.

Ohio - Department of Natural Resources
Division of Planning - Shoreline Management

The ultimate practical uses for dredge spoil have been "brainstormed" often with verbal agreements made but not documented. At the present time, spoil is contained in diked areas in Lake Erie near Toledo which will eventually become public parks or wildlife habitats. One possible long range application that is being evaluated to some extent is to treat certain components of the spoil so

It can be returned as top soil to the original farmland. Reclamation of the strip mining area is being considered by filling them with spoil as well as abandoned quarries along Lake Erie. Consideration is being given to creating additional port facilities for docking and warehousing by filling low areas along the lake shoreline. No plans exist that discuss spoil usage directly but they will have all the divisions within the Department of Natural Resources provide further recommendations for the study.

Ohio - Department of Natural Resources
Environmental Assessment Section

The same possible uses were cited as the above Division; however, in addition, they foresee spoil being used as fill material for airport expansions along the lake shore. Utilizing spoil inland may be rejected by the local people they mentioned because of the bad connotations that it has. Further information will be provided in response to the letter.

Ohio - Department of Economic and Community Planning

This department suggested that the proposed jet port near Cleveland may require extensive quantities of landfill material. Using spoil in a top soil mixture was another suggestion.

Ohio - Department of Transportation

There are no present applications for highway construction but they think that the sand and gravel components may be used as aggregate for the base or sub-base levels of a roadbed. Further recommendations will be made in response to the letter.

SUMMARY OF REGIONAL USAGE

Regional Planning groups in Michigan were aware of the availability of dredge spoil as a landfill material but did not know of any applications unless they consulted with member groups. Probably spoil will be used when made known that it is readily available. A possible use may be as fill for industrial or recreational land areas. The Erie and Niagara Counties Regional Planning Board in Northwest New York thinks that there is no market for dredge spoil as a landfill material because of the competition existing to find suitable sites for industrial waste and sludge. This was made apparent after they met with the Corps of Engineers to select possible sites. Another group in Southwest New York was not knowledgeable about dredge spoil disposal. Many of the Planning Groups in Ohio were not aware of spoil as a resource or aware of present applications. One group remarked that the flat terrain of many parts of the state does not dictate a need for landfill. The Erie Regional Planning Commission, in conjunction with the Corps of Engineers, has selected several disposal sites near Huron and Sandusky in Lake Erie which will be used for recreation or parking. Toledo Metropolitan Area Council of Governments states that keen competition exists between fly ash from industries and dredge spoil as landfill material. In the Youngstown area, specific strip mines are to be reclaimed, wherein spoil may be applicable.

The State Chambers of Commerce in Michigan, New York and Ohio were generally not aware of spoil availability or present usage. All indicated they would consult with local Chambers and with key industrialists and real estate developers along the Lake Erie area.

The State of Michigan Department of Natural Resources has collaborated with the Corps of Engineers over several years in finding practical uses for spoil; namely, industrial land development, recreation, erosion control, beach nourishment, marsh preservation and wildlife habitat improvement. Point Mouillee, south of Detroit, is to be established as a wildlife area with the use of spoil. The Department of Commerce says consideration is being given to using spoil for port development in the town of Monroe. Fly ash is competing with spoil as fill material for this and other locations. Both the Departments of Transportation and Commerce recommended that the sand and gravel be extracted to serve as aggregates for the concrete and asphalt industries. The Transportation Department was not presently using spoil for any purpose.

The Office of Planning Services in New York State does not know of any present applications for spoil but by way of the State Clearinghouse system, recommendations for future applications will be solicited from all those state agencies that are knowledgeable about the subject or are potential users of the spoil. Planning, Commerce, Conservation, Transportation and other departments will make input as well as appropriate regional and federal government agencies. Copies of applicable studies will be supplied.

The State of Ohio has several diked disposal sites in Lake Erie near Toledo that will be used as parks or wildlife habitats, says the Department of Natural Resources. Other possible uses being considered are as a top soil additive, and fill for derelict strip mines, abandoned quarries, port facilities and airport expansions. Using spoil as fill for inland areas may not be a good application in their area because of the poor feeling that people get when asked to accept waste from some other location. A proposed jet port near Cleveland may require extensive quantities of spoil as landfill material, states the Department of Economic and Community Planning. The Transportation Department recommends using the sand and gravel from spoil as an aggregate for roadbed construction.

D R A F T

Memo To: File, cc: E.D., V.E., R.R.

Date: September 19, 1973

From: J. Lee Moser *Jim*

Contract No. 8173

Subject: Dredge Spoil Study
Pacific Coast Summary of
Telephone Conversations

INTRODUCTION

One of the objectives of this phase was to ascertain from public and private groups, who were knowledgeable of this geographical region, the extent to which dredge spoil is being used in any application. A second objective was to solicit ideas and specific recommendations as to exactly how and to what extent spoil could be incorporated into their long range development and land use plans as a stable natural resource for landfill purposes.

Attention was focused on those areas of the West Coast from which the majority of the spoil originates; namely, Portland, Oregon, Seattle, Washington, San Francisco, California and their associated harbors, coastline and estuarine areas.

Several specific questions were developed which would stimulate thinking from each of the groups and provide a uniform response so that the information received from various sources could be readily analyzed and summarized. The questions were developed so that the extent of knowledge about the present nature and availability of dredge spoil could be determined or the extent of application could be determined. Questions were posed which would require the organization to think of various ways the material could be useful as landfill rather than as a problem material. The organization was asked to think of the material as a stable natural resource, readily and economically available along the coastal area and inland to a distance of approximately one hundred miles. Acquisition

and transportation costs were not to be restraints placed on the "brainstorming" process. Each group was asked to express their recommendations quantitatively as related to industrial, residential, agricultural, recreations, or ecological applications. Requests were made for plans and studies that incorporated dredge spoil usage directly or indirectly.

SOURCE OF INFORMATION

Information was secured from public organizations whose scope of responsibility related to the entire state or a specific region of the state. Regional planning groups and councils of government were selected to provide plans and information about local areas since they cut across County and City jurisdictional lines. State Chambers of Commerce were contracted to secure input from the business, industrial and real estate groups. Specific state government agencies were identified and contacted which had either direct knowledge about spoil and its problems or application, or would be a potential user of spoil when made readily available.

The following agencies were contacted in the State governments of California, Oregon and Washington.

California

Dept. of Commerce - Economic Div.

Dept. of Conservation - Resource Conservation

Dept. of Fish and Game - Fisheries, Wildlife Mgmt.

Lands

Dept. of Public Works - Materials and Research

Water Resources

Oregon

Dept. of Economic Development
Division of Highways - Environmental
Dept. of Environmental Quality
Division of State Lands

Washington

Dept. of Commerce and Economic Div. - Ind. Div.
Dept. of Highways
Dept. of Natural Resources
Dept. of Ecology

Regional planning agencies were selected from a current nationwide directory as was the State Chamber of Commerce. In some cases, a State Chamber of Commerce did not exist so the contact was made exclusively with the public agencies. Twenty-six regional organizations were identified as being within the study area of the three principal cities where spoil originated. Appropriate state governmental agencies were selected from current telephone directories in the capital cities then by confirming these choices with the agencies contacted.

STUDY METHODOLOGY

Specific regional planning groups were selected by establishing a 100 mile radius around each of the above mentioned cities where spoil originated. The 100 mile radius is the area defined by the scope of the study. Each of these groups was contacted by telephone to introduce the nature of the study and to solicit their cooperation and assistance in answering our questions. Generally, the conversation was with the Executive Director, Manager or whoever was the most knowledgeable person about dredge spoil or whoever could make the decision to cooperate with our study. The study objectives were discussed at great length with each

organization. A follow-up letter, restating the objectives and formally requesting specific information, was mailed to each planning group.

State Chambers of Commerce or Depts. of Commerce and Industry were also contacted by phone and letter. The study objectives were discussed extensively. Efforts were made to secure as much information over the phone as was possible realizing fully that their response would be on the spur-of-the-moment.

State agencies were contacted by telephone with a followup letter mailed to them. The study was discussed with the Director, Manager, Chief, etc. of each of the appropriate departments, divisions or sections. Attention was focused on those agencies which had a direct responsibility for dredge spoil problems and its application or those which represented a potential user.

SUMMARY OF CONVERSATIONS BY SOURCE

Regional Planning Groups - California

Planning groups in this state have varying degrees of knowledge about the use of dredge spoil, some have extensive knowledge and experience and others have only limited exposure to the problem of disposal.

In areas along the coast, spoil has been used as fill for industrial, residential, commercial and recreational purposes, both on public and privately owned lands or waterways. In other coastal locales, spoil has been used as fill but found very unsatisfactory because of its unstable condition and inability to drain to an extent where it can withstand a load. Governmental officials and private business leaders

have been conducting meetings and studies for several years to find suitable disposal sites and ways of converting spoil to practical purposes economically.

Inland areas generally are not familiar with dredge spoil as a landfill resource material except in a very general way. Historically, sand and gravel has been extracted from the gold mine tailings to be used as an aggregate, but they have not thought of the dredge spoil as another aggregate source. In one area, experimental programs are being conducted in conjunction with the Corps of Engineers to mix dredge spoil and organic matter from the San Francisco Bay area to achieve a satisfactory material for dike and levee construction. Most organizations contacted requested more information about the physical, chemical and hydraulic characteristics.

Regional Planning Groups - Oregon

Dredge spoil disposal is a very current problem in the state of Oregon with an extensive amount of effort being exerted by public and private groups to find useful applications.

In the coastal area, the State University is conducting research to ascertain the suitability of the material for diverse applications. Representatives from government, industry and business have been actively meeting with the Corps to locate suitable disposal sites and practical uses. These meetings and related studies have been occurring along the coast for several years. Specific estuarine areas have been filled to create industrial development sites. The sand and gravel components of the spoil has been extracted by some private firms. Because of water and marine life contaminations, the EPA has forced the landfill operations along

the coastal and estuarine areas to cease. There were some groups contacted that do not have any present application for spoil but are aware of its availability and problems.

Spoil has not been used inland to any great extent because of the mountainous terrain, except for the urban areas along the Columbia River. This area is concentrating on finding solutions to the disposal problem very diligently. Solid waste land fills are being covered by spoil. Lowlands have been filled for residential and industrial development. The Portland Airport has been enlarged by using spoil as landfill. Other types of real estate development sites have been created with fill but the EPA has curtailed the fill operation because of marine life and water pollution.

Studies have been conducted jointly, and are still in progress, by local power companies, federal and state agencies, regional and local governments and private business firms to determine specifically how dredge spoil can be incorporated into their long range statewide development and land use plans.

Regional Planning Groups - Washington

Dredge spoil as a landfill material is generally known by the groups contacted in this state, but some did not know to what extent or the specific application.

In the coastal areas, spoil has been used as fill along the estuaries for industrial development. Studies are continuing to identify longer range usage. Port facilities have been both created and extended until the EPA stopped the action. Gravel is being extracted from some of the spoil to be used as an aggregate. To some coastal groups, spoil usage is a foreign subject or they did not know on the spur-of-the-moment exactly how it is being used in their specific region.

The groups located inland were not aware of local usage. It was stated that possibly their 100 mile distance from the source of the spoil may be too great to benefit economically because of transportation costs.

Those groups along the Columbia River were generally aware of the availability of spoil but did not know to what extent it has or is being used, if ever. Those who were not using the material expressed an interest in its use for the future if made readily and economically available.

CALIFORNIA STATE CHAMBER OF COMMERCE

California is the only state in this region which has a State Chamber. The other two have Departments of Commerce and Industry which perform a similar function as a Chamber of Commerce. These are described under the State agencies portion of the report.

Spoil has been used successfully in the San Francisco Bay area to construct levees and as a source of sand for the construction industry. Some marshlands have been filled to create urban land for PUD's and other subdivision developments. Foster City in San Mateo County was built on spoil material. However, recently passed state laws are placing stringent controls on the development in lowland and causing the use of spoil to be scrutinized very carefully. Developers must have their plans reflect the total environmental impact and provide exhaustive justification for any changes they propose to make to the shoreline. Pilot program have been established to explore the technical and economic feasibility of combining solid waste and dredge spoil to create land extensions in the Bay area.

STATE GOVERNMENT AGENCIES

California - Dept. of Resources

This department has just been newly created, consistent with new laws, to generate studies and develop long range comprehensive plans for all resources including dredge spoil. They have now started the discussion of spoil disposal with the EPA and are formulating ideas for ultimate use. Efforts are proceeding to have local governments initiate plans for long range waste disposal including dredge spoil. They are not aware of the extent of present usage.

California - Dept. of Fish and Game

In the San Francisco Bay area, spoil is processed to separate the useful portion from the portion that contains heavy metals and other pollutants. The useful material is used to reestablish marshland for bird nesting and feeding areas. The shoreline area above the tidal influence, or upland area, is also preserved for wildlife habitation by use of dredge spoil.

California - Dept. of Commerce

It is not definitely known to what extent spoil has been used by businesses and real estate developers, other than as fill for some condominium sites. They felt that trying to transport this material inland will be rejected by the local government because of the negative attitude that many people have about disposing of someone else's waste in their backyard. The developers of the state are already feeling the effect of state laws that are limiting development along the coast to specific areas. This department is deeply involved in finding suitable locations and developing plans that will not have a negative impact on the shoreline and estuarine ecology.

California - Dept. of Transportation

Dredge spoil has been used to some extent to construct embankments of roads that are contiguous to rivers being dredged, but it was not known exactly how much this is practiced along the coastal areas of the state.

Oregon - Division of State Lands

Spoil dredged from the Columbia River is sold by the Corps to public and private users for the construction of parking lots and buildings. The availability of spoil is not widely known since the material is not extensively promoted. The proceeds of the sale are applied to the public school budget. Several studies are in progress to make an inventory of all the spoil material in the estuarine and coastal water areas after which plans will be developed for its ultimate use.

Oregon - Dept. of Environmental Quality

The Corps has been stockpiling and building islands from the material they have dredged from the Columbia River area.

EPA has caused this manner of disposition to stop. The sandy component of the spoil has been used in the concrete industry.

Oregon - Division of Highways

Highway building contractors that generate spoil dispose of it by selling for landfill purposes.

Washington - Department of Natural Resources

Some of the spoil generated in this state is mixed with soil in the cranberry growing regions to improve fertility and change the composition, as well as being sold to private firms for sand and gravel extraction and separation.

Washington - Department of Ecology

Historically, spoil has been used to fill areas for industrial and commercial development and to some extent as agricultural fill. Using dredged spoil for land development purposes is a common practice throughout various parts of Washington. This organization has an extensive library of studies and reports on the subject. A bibliography will be supplied.

Washington - Department of Commerce and Economic Dev.

Spoil has been used by real estate developers to fill low areas along the shoreline but environmental interest groups have been successful in getting this practice stopped. A Shoreline Management Act now exists which largely controls where development can occur along the coastal area. Its enforcement is causing land developers to be completely knowledgeable about the impact their land use and construction activity will have on the total shoreline environment.

Washington - Department of Highways

The sand from dredge spoil has been used extensively for embankments in certain areas of the state, particularly where other aggregate sources are marginal in quality and quantity. This source will continue to be used if the sand is consistent with their specifications.

SUMMARY OF REGIONAL USAGE

Generally speaking, the Pacific Coast Region is very knowledgeable about dredge spoil problems and solutions. Extensive efforts are being exerted by public and private groups to convert the inherent problems to practical applications. Some few groups not immediately adjacent to the coast are not using spoil, but are aware of it as a potential landfill material. It was felt that the mountainous terrain dividing the region is and will be a major factor in economically making use of spoil due to excessive transportation costs.

Throughout the three state area, various groups and agencies have been and are continuing to work with the District Corps of Engineers to locate suitable diked disposal areas or to find practical ways of applying the spoil to land development or land preservation. Studies are in progress to make an inventory of all spoil sources along the coastal area and to develop coastline management plans that will reflect practical applications.

Dredge spoil has been used satisfactorily in many areas as landfill for industrial, residential, commercial and recreational usage. In some of the coastal areas of California, spoil was not a satisfactory fill material because of its unstable qualities and inability to support structures. EPA has stopped many landfill operations because the pollutants are draining from the spoil as it dries and contaminating the marine life and the water from which it was dredged. The State University in Oregon is conducting research to ascertain ways in which spoil can be used without contaminating the environment. Sand and gravel is being extracted to use in the concrete and construction industries. Spoil

is being combined with earth and other materials to construct dikes and levees for flood control. Solid waste landfills are being covered with spoil material. The Portland, Oregon Airport complex has been extended by using spoil as landfill. Port facilities have been expanded and newly developed in certain estuarine and coastal areas. Marshlands have been filled with spoil for PUD development, but the EPA and new state laws are limiting these practices because of the negative effect on the shoreline and estuarine ecology. State owned marshlands have been preserved as bird and wildlife feeding areas and habitats by judiciously applying the spoil. Road embankments have been constructed from spoil when it has been readily available.

In certain agricultural areas, spoil is mixed with the soil to improve the fertility and composition. In other areas, spoil is stockpiled for use by anyone who has a need, however, the availability of the material is not widely advertised.

Most of the groups contacted expressed a need to know the composition and physical, chemical and hydraulic characteristics of the material to which they will have access.

As a general statement, most groups contacted expressed a keen interest in the subject after having it explained to them and a definite desire to share their experience and/or recommendations with us as well as to send reports, studies or plans that have a direct or indirect relationship to present and longer range spoil usage. In most cases, the person contacted wanted to solicit the input of other persons or other groups in his area so that a more comprehensive reply could be made to our questions rather than just relying on their spur-of-the-moment responses over the telephone. They wanted to think more deeply about the questions we posed.

APPENDIX D

**SUPPLEMENTAL DATA
ECONOMETRIC SITE EVALUATION MODEL**

ECONOMETRIC SITE EVALUATION MODEL

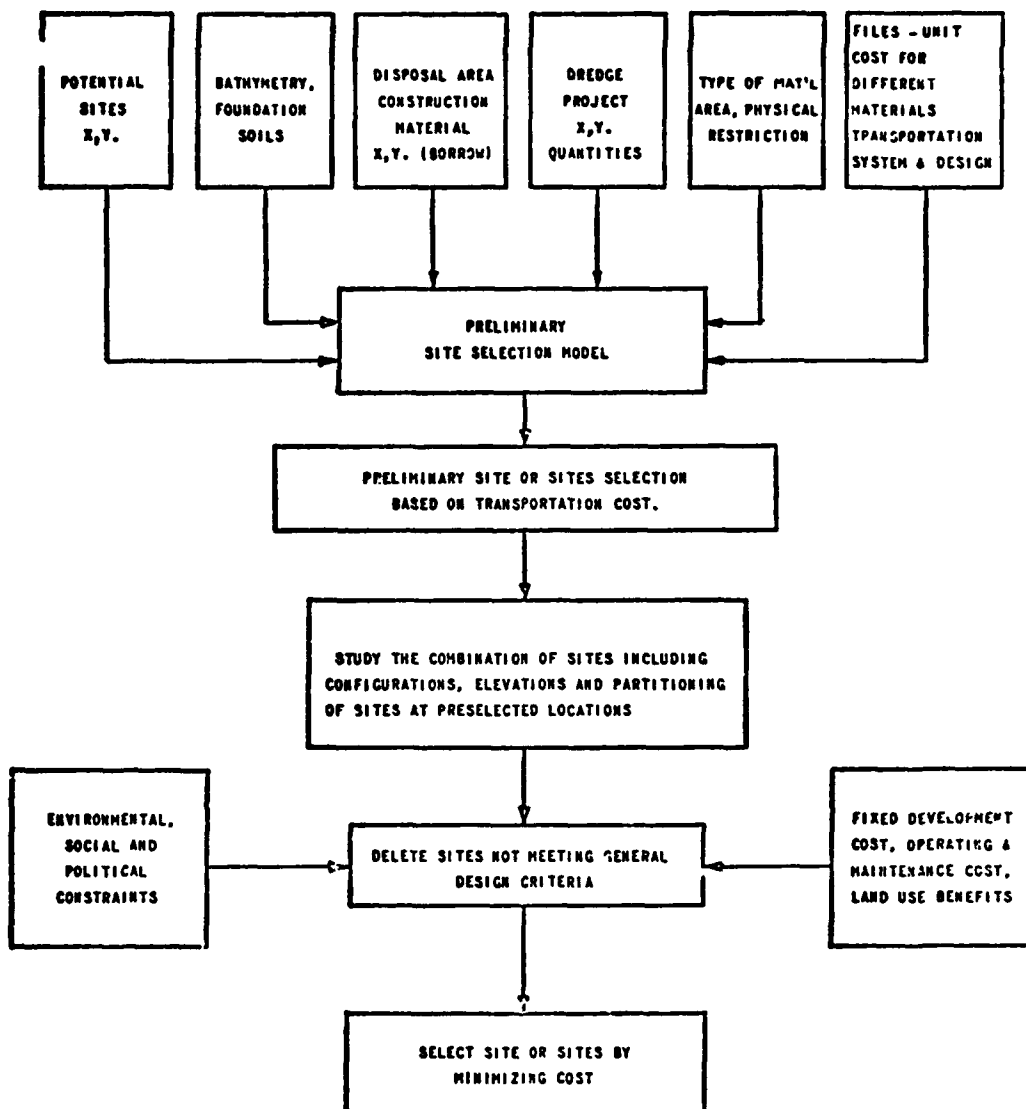
General.

The econometric model described herein for the selection and evaluation of sites for the diked material containment areas for landfill and stockpiling purpose, was largely developed by Green Associates, Inc. during the selection and preliminary design of the diked disposal area in the Upper Chesapeake Bay near Baltimore Harbor. The model has been expanded based on experience in selection and evaluation of solid waste landfill project sites and other site selection processes performed by Green Associates, Inc. This model, by integrating the processes of linear programming, linear regression analysis, and goal achievement matrix models, as a continuous and interrelated process may be used as an empirical foundation of mathematically stated economic proposition.

The basic design of the econometric model is shown in Figure D1 as a simplified system of a complex process to describe the procedure of ranking alternative courses of action by evaluating the weight of each alternative, based upon the effects of such alternatives on a set of goals associated with the plan in question. This econometric model, even though a continuous and interrelated process, may be used in stage applications. The proposed econometric model could be used for:

- a. ranking a large group of preselected sites to facilitate their screening.
- b. assisting in the evaluation of a few alternative sites.

The econometric model described herein was utilized as a methodology of selecting a potential diked dredged disposal site in the area of Baltimore Harbor and approach channels for the State of Maryland. The difficulty in this application predominantly was that a multi-purpose use was considered only as secondary to the basic need of improving the economic posture of Baltimore Harbor, which was the basic concern for a Federal project to deepen Baltimore Harbor and approach channels.



by
GREEN ASSOCIATES, INC.
Engineers-Architects-Planners
Towson, M.J. 21204

ECONOMETRIC MODEL

Figure D1

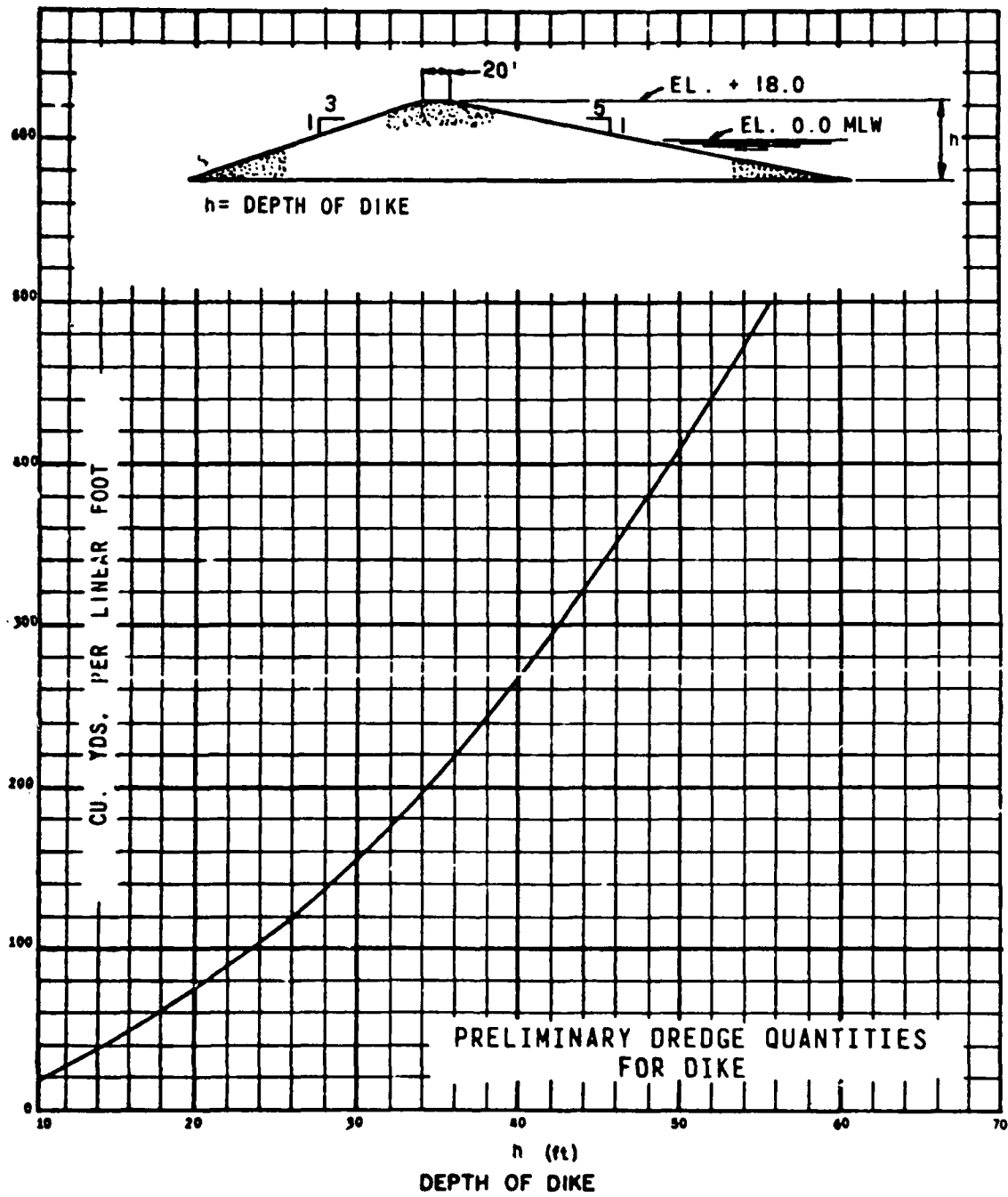
The evolvement of the project dramatically indicated benefits to the Chesapeake Bay which could be accrued by the State of Maryland. This project provided the basis for restriction of open dumping in the estuary and the control of dredged material disposal from channel deepening, construction projects, and maintenance dredging. As this report indicates, the process of site selection within regional planning is a very time consuming undertaking. Experience in the Hart-Miller Island diked dredged material disposal site selection pointed up the need for such long range planning. The econometric model herein described could be used to evaluate contained dredged material disposal areas selected from the potential sites which have been designated by long range planning and preferably zoned for such ultimate use; or, the model could be used to compare various options where cost participation is shared by several benefactors.

Potential sites.

Potential sites for the Baltimore Harbor Dredged Material Disposal Sites were defined by coordinates (x,y) to assist in the first screening of all inventoried sites in the northern Bay. The first screening was based on the capability to contain a minimum volume, transportation distance, and environmental considerations, although transport economy was one of the major considerations. Out of 70 candidate sites only seven sites met basic economy, feasibility and environmental criteria requiring detailed consideration.

Bathymetry, foundation soils.

Depth of water and bottom conditions requiring specific cross section and slopes for the dike wall affect substantially the construction of the containment area and thereby the unit cost of dredged material disposed. The fetch and other factors required to determine the top elevation of the dike and its width often have a bearing on economical containment area design. A chart, similar to that shown in Figure D2 can be entered in the computer files to vary the pertinent characteristics to determine quantities for a linear foot or dike construction. Easily added is a subroutine which can automatically develop charts for quantities as mathematical algorithms controlled by variables characteristic of the given site.



DATE: AUGUST, 1970

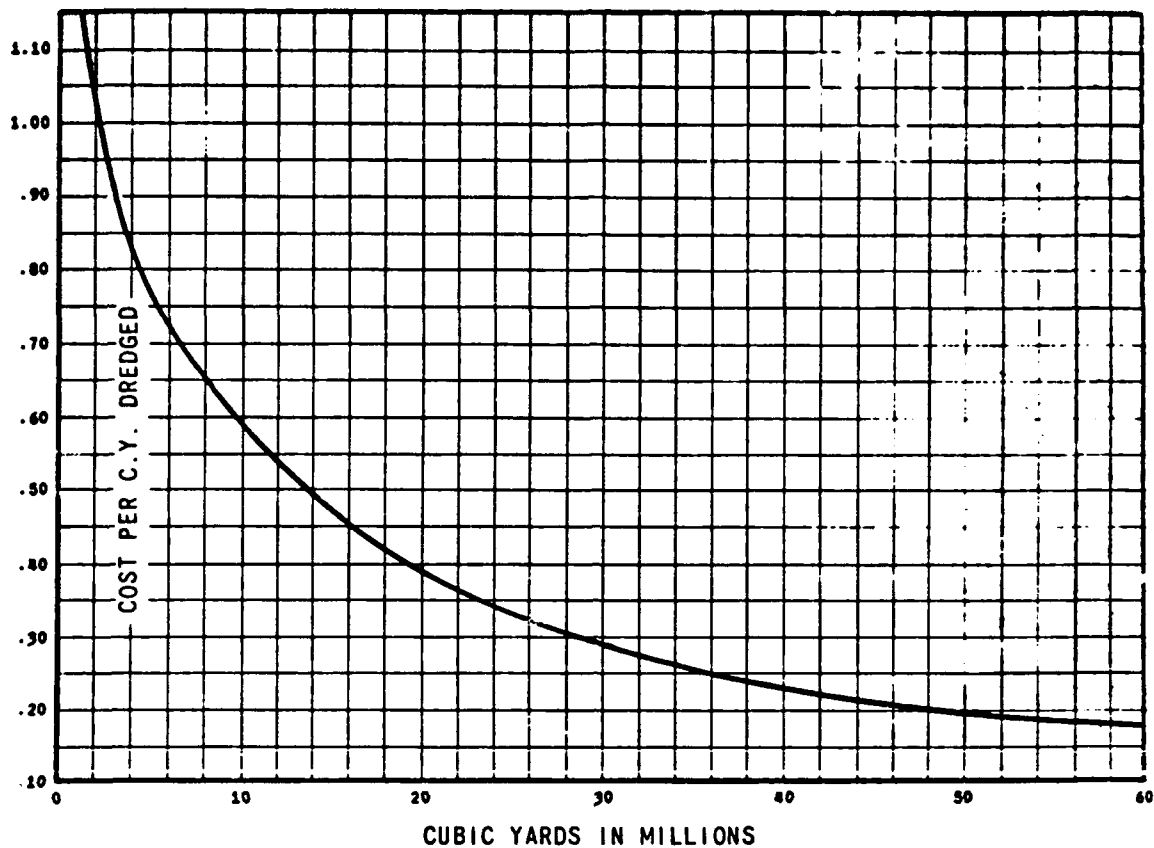
FIGURE D2

Disposal area construction material.

It is seldom possible to construct dikes from material found inside of the future containment area. Economically, this was a tremendous factor for the Hart-Miller Island site selection, as borrow material coordinates (x,y) were located inside the diked disposal area, practically at the center of gravity of construction. This removal of native material for construction provided additional disposal volume, lowering the overall disposal unit price. The subroutine included in the model retrieves data from files to determine the cost of borrow, its transportation, and riprap as required for construction of the containment area. Special cost items for achieving water quality, landscaping, and environmental mitigation at specific sites may be added as separate input factor.

Dredged project quantities.

The dredged project as a unit or a group of projects with their locations expressed by their coordinates (x,y) is identified and dredged quantities to be disposed of are computed and entered in the model's subroutine. This subroutine is a basic classical transportation model which normally is a key in preliminary site selection due to the fact that sites have over 80% of their cost increase through the life cycle related only to transportation costs. The construction costs vary by locale, market conditions, methods of excavation, transportation and placement. However, the model does require certain dredging unit costs averaging processes for preliminary analysis. Figure D3 shows a sample of the unit cost methodology used to evaluate the transportation effect on the site selection. Referring to the files the model will determine the most desirable sites from a transportation economy standpoint. In stage application this process is refined and repeated after the first group of sites are selected where linear programming and mathematical optimization techniques are modified to include fixed costs of site development. Sample output of such an analysis made by the staged model is shown on the following pages and on Figure D4.

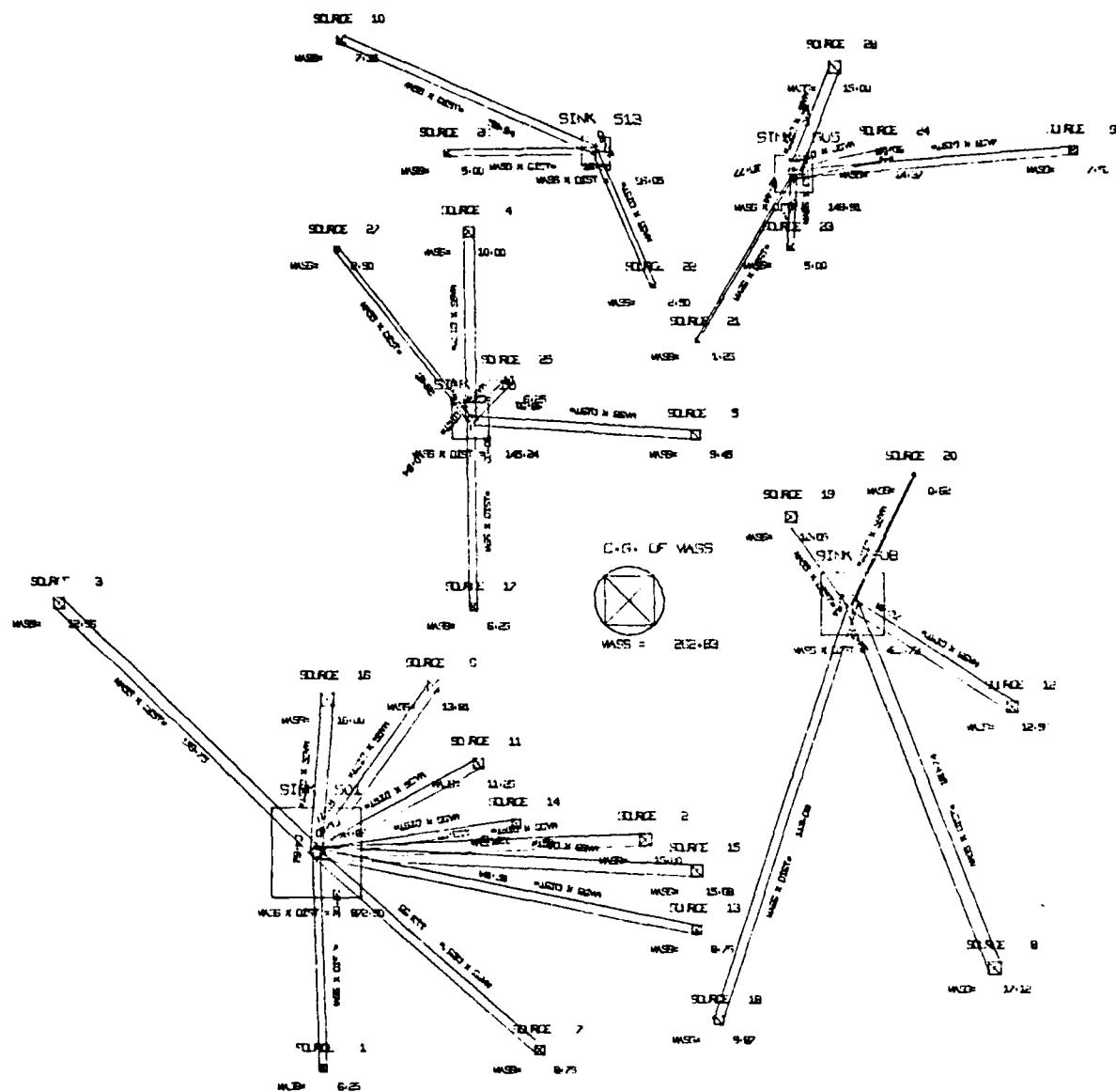


DREDGING UNIT COSTS (AVERAGED LOW BIDS - 1969)
FOR PRELIMINARY ANALYSIS

NOTE: ADD \$.05/C.Y. FOR EACH MILE OF MATERIAL TRANSPORTED.
ADD \$.15/C.Y. FOR DUMPING
COSTS BASED ON 1969 PRICES

DATE: AUGUST, 1970

FIGURE D3



COMPUTER PLOT OF DISPOSAL VOLUMES
MINIMIZING TRANSPORTATION COSTS

FIGURE D4

SAMPLE FOR REFUSE DISPOSAL SITE SELECTION STUDY MARCH 72 MPS

DISTANCE OF CENTER OF GRAVITY OF THE SOURCES FROM THE REFERENCE AXIS

YEAR X-COORDINATE Y-COORDINATE TOTAL SOURCE VALUES

1969 66.897 150.581 262.830

1980 66.887 130.676 709.890

SAMPLE FOR REFUSE DISPOSAL SITE SELECTION STUDY MARCH 72 MPS

GE 1 W.R. 1

DESTINATIONS-

501	502	503	504	505	506	507	508	509	510
1	1150	2400	25143	9000	27117	21146	21106	2146	17150
2	7157	6119	12150	17189	15100	18109	9169	9170	13103
3	11112	11110	20190	21109	22100	22121	17140	14100	19112
4	16199	10199	17183	6142	12131	0186	16163	19113	4119
5	17156	10159	5142	3126	7190	10129	7119	19170	5123
6	6121	1110	19106	14101	20167	10164	11104	0155	6100
7	12197	9123	19151	20126	24109	20143	16169	6133	15137
8	17141	17130	12180	21120	21100	20157	11100	14157	23151
9	22114	29117	12106	11191	6107	15120	14100	34120	19124
10	10144	17190	21190	13147	12107	6110	23167	20157	11124
11	9190	11147	14150	15193	19106	17107	11170	7109	7172
12	10113	17106	7154	15197	18170	29120	9177	20107	18120
13	10110	10100	12195	14100	18172	15109	10152	8107	16114
14	5104	9179	16151	15176	17194	14193	12119	7120	9107
15	0174	0171	12104	12179	17143	14154	9122	10117	14104
16	3159	3137	16149	17124	21107	18198	13167	6104	9130
17	8103	11196	11125	12100	16163	15174	0143	10156	4116
18	12151	12140	14100	16139	20126	7130	13160	9150	8106
19	17106	10149	2122	6191	7160	4171	14120	19190	9114
20	21149	14153	1141	8166	9125	2177	15195	23163	10189

SAMPLE FOR REFUSE DISPOSAL SITE SELECTION STUDY MARCH 72 MPS

PAGE 1 PART 2

DESTINATIONS-

1	19.01	10.53	20.20	19.51	22.00
2	4.96	8.30	16.25	12.94	10.30
3	23.01	20.30	21.02	9.13	10.10
4	22.10	25.55	4.60	8.08	7.4
5	12.75	16.10	8.43	0.64	2.01
6	12.90	10.50	15.59	4.94	11.06
7	10.44	5.96	21.03	15.20	17.31
8	5.52	7.27	26.74	23.43	20.29
9	21.13	26.97	10.53	23.22	14.26
10	29.23	32.50	0.01	11.32	14.46
11	10.27	19.61	16.10	7.69	12.38
12	7.92	19.90	21.42	10.11	14.98
13	4.26	5.19	19.36	10.05	12.92
14	0.11	11.46	16.53	9.70	12.01
15	9.14	0.40	10.07	14.76	11.62
16	15.00	10.34	10.01	5.32	14.29
17	13.02	17.16	12.77	4.00	9.05
18	3.01	7.77	2.04	0.53	5.39
19	8.05	12.69	12.36	9.05	5.91
20	10.48	16.33	14.11	12.60	7.67

DESTINATIONS-

511	512	513	514	515
21	16.79	18.14	6.61	10.78
22	16.96	20.31	4.24	11.01
23	16.80	16.52	6.40	14.87
24	16.93	22.78	6.54	19.03
25	18.02	21.37	6.96	5.72
26	24.41	27.75	3.30	9.38
27	24.72	26.06	7.87	6.81
28	17.80	23.53	7.08	19.78

SOURCES

SAMPLE FOR REFUSE DISPOSAL SITE SELECTION STUDY											MARCH 72		MPS	
TOTAL QUANTITY FROM ALL SOURCES TO EACH DESTINATION, IN USERS UNIT-														
DESTINATIONS---														
	501	502	503	504	505	506	507	508	509	510				
1969	3777.3	2895.7	3428.6	3448.3	4129.3	3632.0	3781.7	3149.4	4074.7	3273.0				
	501	502	503	504	505	506	507	508	509	510				
1980	10157.7	7708.7	9035.6	8978.0	10913.5	9600.3	10536.3	8961.1	11022.1	8630.2				
CONT'D-														
	511	512	513	514	515									
1969	3373.6	4151.6	3941.6	3387.6	3191.7									
	511	512	513	514	515									
1980	9015.4	11107.0	10348.1	8981.8	8271.0									

SAMPLE FOR REFUSE DISPOSAL SITE SELECTION STUDY						PAGE 1 PART 1	
MARCH 72 MPS							
QUANTITY, FROM EACH SOURCE TO MOST ECONOMICAL DESTINATION							
YEAR 1969	501	505	508	510	513		
1	30.6	0.0	0.0	0.0	0.0		
2	113.5	0.0	0.0	0.0	0.0		
3	139.7	0.0	0.0	0.0	0.0		
4	0.0	0.0	0.0	41.9	0.0		
5	0.0	0.0	0.0	49.5	0.0		
6	85.7	0.0	0.0	0.0	0.0		
7	113.5	0.0	0.0	0.0	0.0		
8	0.0	0.0	189.7	0.0	0.0		
9	0.0	50.0	0.0	0.0	0.0		
10	0.0	0.0	0.0	0.0	58.9		
11	61.8	0.0	0.0	0.0	0.0		
12	0.0	0.0	72.4	0.0	0.0		
13	87.9	0.0	0.0	0.0	0.0		
14	38.0	0.0	0.0	0.0	0.0		
15	137.2	0.0	0.0	0.0	0.0		
16	64.6	0.0	0.0	0.0	0.0		
17	0.0	0.0	0.0	26.0	0.0		
18	0.0	0.0	119.0	0.0	0.0		
19	0.0	0.0	41.7	0.0	0.0		
20	0.0	0.0	2.6	0.0	0.0		
21	0.0	7.2	0.0	0.0	0.0		

SAMPLE FOR REFUSE DISPOSAL SITE SELECTION STUDY					MARCH 72		MPS	
QUANTITY, FROM EACH SOURCE TO MOST ECONOMICAL DESTINATION								
YEAR 1980								
	501	505	508	510	513		PAGE 1	PART 1
1	74.0	0.0	0.0	0.0	0.0			
2	461.1	0.0	0.0	0.0	0.0			
3	322.0	0.0	0.0	0.0	0.0			
4	0.0	0.0	0.0	55.6	0.0			
5	0.0	0.0	0.0	150.4	0.0			
6	247.0	0.0	0.0	0.0	0.0			
7	309.0	0.0	0.0	0.0	0.0			
8	0.0	0.0	281.4	0.0	0.0			
9	0.0	154.3	0.0	0.0	0.0			
10	0.0	0.0	0.0	0.0	152.7			
11	146.1	0.0	0.0	0.0	0.0			
12	0.0	0.0	179.5	0.0	0.0			
13	266.9	0.0	0.0	0.0	0.0			
14	92.5	0.0	0.0	0.0	0.0			
15	314.2	0.0	0.0	0.0	0.0			
16	167.4	0.0	0.0	0.0	0.0			
17	0.0	0.0	0.0	60.0	0.0			
18	0.0	0.0	411.5	0.0	0.0			
19	0.0	0.0	132.3	0.0	0.0			
20	0.0	0.0	11.4	0.0	0.0			
21	0.0	18.6	0.0	0.0	0.0			

D18

Type of material, area, physical restriction

When the considerations described herein have been manually entered for the next stage computations, various file data is required to evaluate sites by modifying the unit costs for different materials based on their type and anticipated difficulties in construction, operating costs, etc., as deviating from the expected norms. Only these variables, which have the most effect on economic construction of containment areas are considered. At this point a factor can be placed as input having a veto power over the particular site. Some considerations which may necessitate this veto factor are:

- a. Incompatibility with the area land uses.
- b. Infeasibility of construction by present technology.
- c. Effect on endangered species or rare species for the given region.
- d. Causing a break in the food chain process to valuable species of the area.
- e. Affecting vital economic or social activities (safe use of snipping, recreation, etc.).

Files

Files carried by this model are required to a degree dependent on the depth of study involved. In all cases files are required for unit costs of dike construction and material:

- a. Transportation unit costs.
- b. Transportation unit costs for dredged material disposal
- c. Fixed costs such as:
 - 1 Land acquisition
 2. Damage to present activities
 3. Improvements necessary to make site suitable for intended use, etc.
 4. Land use benefits

The preliminary site selection model hereby developed, even though it does include fixed costs, is still basically affected predominantly by transportation costs. Desired land use, social and economic costs and physical restraints have to be evaluated at much greater lengths. Should fixed costs become significant, even at the preliminary screening process,

data for linear programming can be developed, including these fixed costs. The distance matrix developed for the sites, sources and the dredged projects, with corresponding data from the files, assist development of a cost matrix in which elements are the products of the distance matrix and vectors of the variables between the site and source. As indicated on Figure D4, this analysis indicates tons of materials transported and total ton miles if only one site is available for operation. The solution will provide not only the ranking of sites for preferences based upon economy, but also feasibility of selecting a group of sites or sources for the most economical operation.

The most difficult portion of the model is development of data for a goal achievement matrix. The environmental, social and political constraints, fixed development costs, land use benefits and special considerations for land development and environmental mitigation, water quality maintenance costs, etc., are the most difficult to express mathematically. Some of these elements could be expressed as benefits and costs in a dollar amount. However, for evaluation of costs of many intangible items it may be impractical to have assigned fixed values. A subroutine of a goal achievement matrix can be used in various ways. Based on experience, a properly defined evaluation matrix, even if different values are given by various individuals assigning numerical regional and local importance values, provides us with the finite results having close agreement for ranking of environmental and social desirability for the sites evaluated. The linear programming model, after having been run several times, if sensitivity analysis is desired, may have sufficiently reduced the number of sites under consideration. A greater number of variables affecting the economic optimum system, including considerations for socio-environmental impacts, can be considered. A number matrix, as one approach, similar to a procedure for "Evaluating Environmental Impact", published by the Geological Survey, Circular 645, provides a numerical solution to evaluate the environmental impact of a proposed action. The proposed mathematical subroutine for a second approach is a solution to determine for every important element a_{ij} which may vary $-10 < a_{ij} < 10$, for maximum negative and positive values in relation to achieving

goal objective. The final summation of the elements in the goal achievement matrices in the j th column represents goal achievement index for the j th plan, giving the plan with the highest index number as a possible best choice. The flow chart in Figure D5 indicates the proposed procedure to be used for the evaluation and preliminary site selection of contained dike disposal areas.

L.P. = LIN
 G.A.M. = G
 $D(x_i) = U$
 $x_i = \text{FILE}$
 $x_i = \text{LEVEL}$

```

    graph TD
        subgraph TOPOLOGIC_DATA [TOPOLOGIC DATA]
            subgraph FILES [FILES]
                UC[UNIT COSTS  
TRANSPORTATION  
CONSTRUCTION]
                SC[SITE  
SCREENING  
CRITERIA]
                OM[OPERATION  
MAINTENANCE  
UNIT COSTS]
                LC[LAND  
BENEFIT  
COSTS]
            end
            NA-01[NA-01  
FEASIBILITY  
AND  
STATISTICAL  
ANALYSIS]
            DP[POTENTIAL  
SITES  
(x,y)]
            AA[AVAILABLE  
AREA  
(x,y)/(x,y)]
            MS[MATERIAL  
SOURCES  
(x,y)]
            DP --> NA-01
            AA --> NA-01
            MS --> NA-01
            NA-01 --> DV{DATA  
VALIDATED}
            DV -- YES --> SC-32[SC-32  
SITE-SPECIFIC  
COST MATERIALS  
(x,y), (x,y)]
            DV -- NO --> DP
        end

        subgraph SOCIAL_ENVIRONMENTAL_ANALYSIS [SOCIAL & ENVIRONMENTAL ANALYSIS]
            NA-73[NA-73  
LINEAR  
PROGRAMMING]
            GFA[DEFINE  
GROUPS FOR  
ANALYSIS]
            COV[COMPARATIVE  
WEIGHTS]
            RWA[RELATIVE  
WEIGHTS BASED ON  
ALTERNATIVES]
            QDS[QUANTIFY  
DEVELOPMENT  
SUBSTRATE]
            NA-73 --> GFA
            GFA --> COV
            COV --> RWA
            RWA --> QDS
        end

        subgraph ECONOMIC_ANALYSIS [ECONOMIC ANALYSIS]
            SLP[STANDARD  
LINEAR  
PROGRAM  
DEFINE  
OBJECTIVE  
FUNCTION  
OF OBJECTIVE]
            A2[ADJUST L.P.  
SECOND  
SCREENING]
            IIS[REMOVE  
INFEASIBLE  
SITES  
LIFE CYCLE]
            CES{CHANGE  
IN L.P.  
SOLUTION}
            EOS[EVALUATE  
OPTIMIZED  
SYSTEM]
            SLP --> A2
            A2 --> IIS
            IIS --> CES
            CES -- YES --> EOS
            CES -- NO --> A2
            EOS --> EIR{ECONOMIC  
INPUT  
RESTRICTIONS}
            EIR -- YES --> BIA[DEGRADATION  
ANALYSIS  
(x,y) L.P.]
            BIA --> ASA[ACCEPT  
SYSTEMS  
BASED  
ON]
            ASA --> AAI[ACHIEVEMENT  
INDEX  
(x,y)]
            AAI --> RAS[RANGE OF SITES  
(x,y) FOR ALL (x,y)]
            RAS --> PDP[POLITICAL  
DECISION  
PROCESS]
            EIR -- NO --> SLP
        end

        TOPOLOGIC_DATA --> SLP
        TOPOLOGIC_DATA --> A2
        TOPOLOGIC_DATA --> IIS
        TOPOLOGIC_DATA --> CES
        TOPOLOGIC_DATA --> EOS
        TOPOLOGIC_DATA --> EIR
        TOPOLOGIC_DATA --> BIA
        TOPOLOGIC_DATA --> ASA
        TOPOLOGIC_DATA --> AAI
        TOPOLOGIC_DATA --> RAS
        TOPOLOGIC_DATA --> PDP
    
```

TOPOLOGIC DATA

- FILES
 - UNIT COSTS (TRANSPORTATION, CONSTRUCTION)
 - SITE SCREENING CRITERIA
 - OPERATION MAINTENANCE UNIT COSTS
 - LAND BENEFIT COSTS
- NA-01 FEASIBILITY AND STATISTICAL ANALYSIS
- POTENTIAL SITES (x,y)
- AVAILABLE AREA (x,y)/(x,y)
- MATERIAL SOURCES (x,y)
- DATA VALIDATED (YES/NO)
- SC-32 SITE-SPECIFIC COST MATERIALS (x,y), (x,y)

SOCIAL & ENVIRONMENTAL ANALYSIS

- NA-73 LINEAR PROGRAMMING
- DEFINE GROUPS FOR ANALYSIS
- COMPARATIVE WEIGHTS
- RELATIVE WEIGHTS BASED ON ALTERNATIVES
- QUANTIFY DEVELOPMENT SUBSTRATE

ECONOMIC ANALYSIS

- STANDARD LINEAR PROGRAM DEFINE OBJECTIVE FUNCTION OF OBJECTIVE
- ADJUST L.P. SECOND SCREENING
- REMOVE INFEASIBLE SITES LIFE CYCLE
- CHANGE IN L.P. SOLUTION (YES/NO)
- EVALUATE OPTIMIZED SYSTEM
- ECONOMIC INPUT RESTRICTIONS (YES/NO)
- DEGRADATION ANALYSIS (x,y) L.P.
- ACCEPT SYSTEMS BASED ON
- ACHIEVEMENT INDEX (x,y)
- RANGE OF SITES (x,y) FOR ALL (x,y)
- POLITICAL DECISION PROCESS

FIGURE D5
FLOW CHART OF
ECONOMETRIC MODEL